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ARCHAEOLOGICAL NOTES

THE VILLA OF GOOD FORTUNE AT OLYNTHOS

PLATES XXVIII-XXXI

THE finest single discovery of the 1934 campaign at Olynthos was that of the Villa of Good Fortune (Fig. 1). The discovery of the Villa was occasioned by the finding on its site of an inscription recording the sale of a house to a certain Thyneainetos. Not only is the house the largest and architecturally the most interesting of the houses discovered at Olynthos, but the mosaic floors in four of the rooms should rank as the most important Hellenic (I do not say Hellenistic) mosaics known.

The house is of the usual width, approximately 17 m. wide, but the length (26 m.) is nine meters greater than the length of the normal Olynthian house. Consequently there was room for a large peristyle court with three pillars to a side, surrounded by three spacious porticoes on the east, south, and west sides, and a still broader portico, the *pastas*, on the north. The southeast and southwest corners of the house are each occupied by a single very large room (of these, one was a storeroom), while along the north side lie five large rooms and a rear entrance passage; the east and west ends of the *pastas* are each occupied by a single room.

A stair base in situ in the east portico shows that a stairway ascended towards the south and we may therefore presume that the house possessed a second storey with some ten rooms and broad galleries. The house had clearly been burned by fire and presents a conspicuous exception to the other houses at Olynthos which have been systematically plundered. Numerous fragments of charred wood and half-baked mud bricks, mingled with shattered roof tiles, were found, especially in the *pastas*.

Five unique mosaics were the most interesting find in the Villa. They are to be classed with the earliest examples with definite mythological scenes yet discovered and are the only ones with inscriptions earlier than those of Delos. These mosaics are executed in natural pebbles, not in square cubes, as was the practice in the Hellenistic, Roman, and Byzantine periods (except for a few unfigured mosaics laid in pebbles on outside pavements at Pompeii). The pebbles are, for the most part, black and white, though a few red, yellow, and green ones are used. The designs, as in the case of red-figured vases and of textiles, were executed in a light color against a dark background. As there is little attempt at perspective and no attempt at background, textiles and vases are a better parallel than mural paintings. The earliest Greek tapestries—those found in Russia—also have mythological scenes in rectangular panels and inscriptions;¹ it is accordingly safer to argue that these mosaics were influenced by textile designs and scenes on vases.

¹ Cf. Stephani, *C.R.*, 1878-9, Pl. iv (from Kertch with mythological scenes in a rectangular panel in light color against a red or dark background, as in our Achilles mosaic, and with inscriptions which seem to date about the same time, the fifth century B.C.). Cf. also Minns, *Scythians and Greeks*, pp. 335 ff. The same sort of Hellenic (not necessarily Hellenistic) scenes persist down into Graeco-Roman tapestries of Egypt, cf. Wace, *A.J.A.*, XXXVIII, 1934, pp. 109-111. The wave, or running scroll pattern, which occurs in the Achilles and Dionysos mosaics, is especially common as a border on tapestries.

THE VILLA OF GOOD FORTUNE

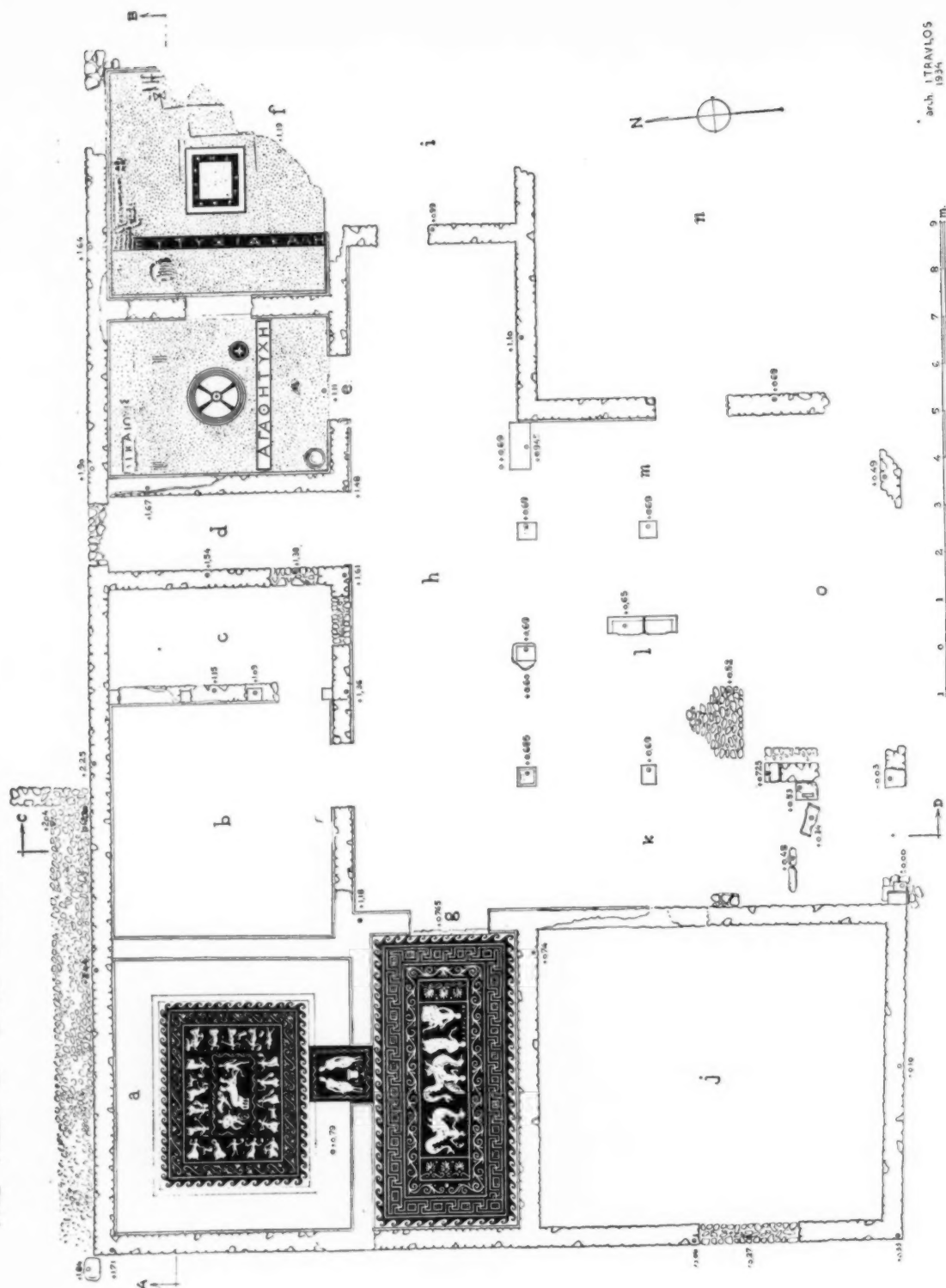


FIG. 1.—PLAN OF THE VILLA OF GOOD FORTUNE AT OLYNTHOS

Arch. ITRAVLOS
1934

In the northeast corner room, which is entered from the west, lies the Eutychia mosaic (Fig. 2). At the back is a black symbol representing the letter Ξ , below it the double axe in black, and in the middle of the north side, a swastika in white. Below the swastika, the artist gave his imagination play and produced a fantastic design in putting his white pebbles together at random to make little irregular patterns. In the lower left corner he laid the pebbles in such a way that they resemble a hand. In the case of the inscription, he was more careful. On a solid dark background he laid in white pebbles the letters, EYTYXIAKAAH, though he failed to measure the space accurately and as a result the H is crowded in at the right. In the center of the room he placed a square in true Macedonian style, such as is seen only on coins of Macedonia and Thrace;¹ in the square in white letters on a dark background is the inscription, AΦOΔITHKAAH, running from left to right in a direction opposed to that found on the coins, but in the same direction as die-engravers would cut them. EYTYXIA may be a proper name, as we find it in later inscriptions and on a Roman mosaic from Corinth;² the inscription, however, probably means "Good luck is beautiful" (cf. the Roman mosaic at Salzburg with "Hic habitat felicitas").³ Even in the Corinth mosaic the figure is a personification of Good Luck. In the second inscription AΦOΔITH too may be, of course, a proper (mortal) name, or again the phrase may be interpreted "love is beautiful." The inscriptions, in the latter case, would express a not unhappy combination of personified love and luck. If the names are those of goddesses or mortals, we have the first examples of *kalos* inscriptions in mosaics.

The TYXH mosaic lies in the anteroom⁴ of the northeast corner room (Fig. 2).

Cf. Kendrick, *Cat. of Textiles from Burying-Grounds in Egypt*, I, nos. 6, 34, 180, 265, Pl. XXVI; Pfister, *Tissus Coptes du Musée du Louvre*, Pls. 13, 14; Wulff-Volbach, *Spätantike und koptische Stoffe*, Pls. 75, 76; Pfister, *Rev. d'Arts Asiatiques*, 1928, Pl. 7; von Falke, *Kunstgeschichte der Seidenweberei*, I, p. 17, figs. 8, 15; the pattern occurs on the tunic of the Etruscan terracotta warrior in the Metropolitan Museum, *Bull. Metr. Mus.* XXVIII, 1933, p. 31, fig. 4. On the influence of textiles on mosaics, cf. also B.S.A. XIII, Pl. xi; Hinks, *Catalogue of Greek, Etruscan and Roman Paintings and Mosaics in the British Museum*, p. lix (Hinks, pp. xlv ff., agrees that the Olynthian mosaics are the earliest). Nereids and sea-animals are a frequent subject in textiles and silk stuffs; cf. von Falke, *op. cit.*, fig. 56; Stückelberg, *Walliser Gewebefunde*, Pls. 1, 2; A.J.A. XXXVIII, 1934, p. 109, Pl. XI; Hinks, *op. cit.*, pp. 76 ff., figs. 83-85. In the Ashmolean Museum I noticed some bits of tapestry from Akhmin or the Fayûm, dating from the fifth century A.D. One shows St. George on horse-back spearing a dragon in a roundel with a scroll pattern about it. This carries on the tradition of our mosaic with a roundel showing Bellerophon on horse-back slaying the Chimaera, cf. *Excavations at Olynthus*, V, Pls. 1, 12, 13. On the rider motive, cf. *Röm. Mitt.*, XXXVIII-XXXIX, 1923-24, pp. 268 ff.

¹ The following list makes no pretence of completeness: Edonoi (Babelon, *Traité*, Pl. XLV, 5-6), Mossai (*ibid.*, Pl. XLVI, 18-21), Alexander I (*ibid.*, Pl. XLVII, 5-7, Pl. XLVIII, 1-2, Pl. CCCIII, 1), Aineia (*ibid.*, Pl. CCCII, 9-10), Mende (*ibid.*, Pl. CCCIV, 13-16, Pl. CCCV, 3-12, Pl. CCXVI, 1-8), Terone (*ibid.*, CCCVIII, 12), Akanthos (*ibid.*, Pl. CCCIX, 1-10), Amphipolis (*ibid.*, Pl. CCCXX, 10-19, Pl. CCCXXI, 1-2, 5-6), Herakleia Sintica (*ibid.*, Pl. CCCXXI, 16-19), Thasos, (*ibid.*, Pls. CCCXXII, f.), Abdera (*ibid.*, Pls. CCCXXIII ff.), Maroneia (*ibid.*, Pls. CCCXL ff.), and Ainos (*ibid.*, Pl. CCCXLIV, 15). For other similarities between coins and mosaics cf. Robinson, *Olynthus*, V, p. 8, note 24; p. 12, note 41. The "butterfly" pattern in the mosaic, *Olynthus*, V, p. 12, occurs on the Skione altar (C.V.A., Robinson Collection, Pl. XLVIII).

² Cf. Broneer, A.J.A. XXXVII, 1933, p. 561 and Pl. LXIV.

³ Cf. *Arch. Anz.* XLVIII, 1933, p. 705. Cf. also Pindar, *Ol.* VI, 81.

⁴ The walls of this room were preserved in places to a height of about 0.50 m. They are faced with a beautiful smooth stucco, white below and red above; the white band at the base of the wall is divided into panels by vertical incised lines and these are separated from the red plaster above by a horizontal line, also incised.

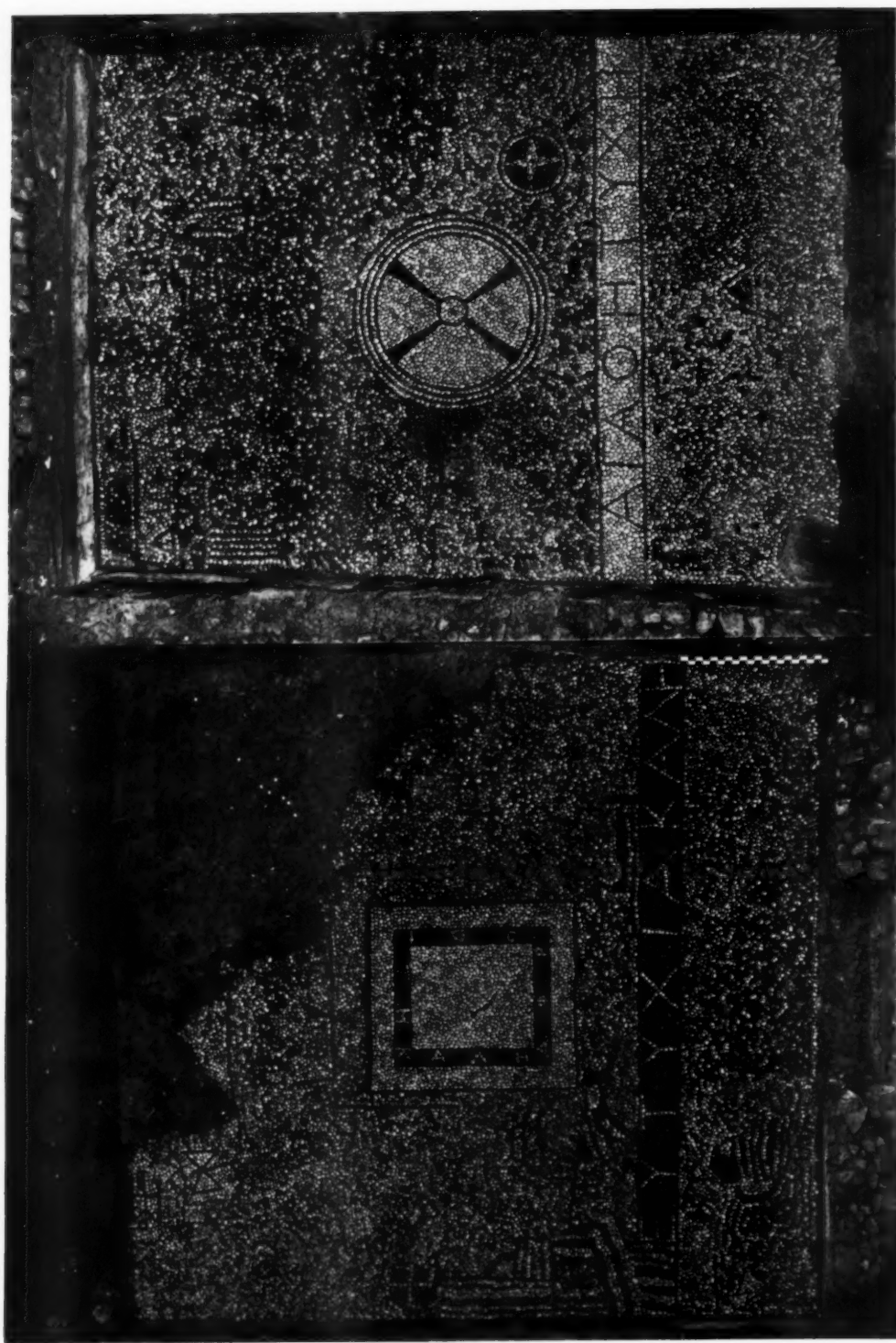


FIG. 2.—MOSAICS FROM OLYNTHOS WITH INSCRIPTIONS AND SYMBOLS (DOUBLE AXE, SWASTIKA, WHEEL OF FORTUNE)

Near the center of the mosaic, which is worked in small pebbles laid close together, is the wheel of good fortune;¹ it has four outer circles and an inner dotted circle, while its spokes form a St. Andrew's cross. To the right and slightly below this wheel is a smaller circle with a St. George's cross. The interpretation of the wheel as a symbol of good fortune is confirmed by the inscription, ΑΓΑΘΗΤΥΧΗ, in black pebbles against a white ground (as though the black-figured style on vases were not yet forgotten). This contrasts with the opposite style in the Eutychia mosaic, just as in bilingual vases of the early fifth century one has red figures and black figures on the same vase. In the northwest corner, a similar band of smaller letters was started and we have ΔΙΚΑΙΩ[?], but the band was never continued. To the right of this inscription, at a point approximately midway between the side walls of the room and extending above the line of the preceding letters, is a four-barred ξ; the intervening space is covered with pebbles and there is no evidence of repair. The ξ has nothing to do with Δικαίω and corresponds to an A which occupies a similar position at the lower end of the mosaic. "To Dikaïos, good fortune" seems to be the meaning, and possibly Dikaïos, whose name is known from coins² as that of a magistrate, was at one time the owner of the house. ξ would then be a symbol of good luck³, as also A, which became a talisman or amulet in the form of a mason's level. Alpha is often associated with the wheel, as at Olynthos. In a Pompeian mosaic,⁴ a skull surmounted by an A rests on a wheel, which is perhaps no longer a symbol of good luck, but a representation of the instability of fate. In Roman medallions the A level appears

¹ Cf. A. B. Cook, *Zeus*, II, p. 57, n. 6. The idea of the Wheel of Fortune I believe to be as old at least as Pindar, *Ol.* II, 23. Sophocles, frag. 787 (Nauck) says: πότμος . . . ἐν πυκνῷ θεοῦ τροχῷ κυλάειται. Cf. Anacreontea (ed. Preisendanz) 32. Cicero, *In Pison.*, 22, is wrongly supposed to be the earliest reference to the Wheel of Fortune. Literary references abound from the time of the Latin elegiac poets (Tibullus, 1, 5, 70; Propertius, II, 8, 8; Ovid, *Tristia*, V, 8, 7; Horace, III, 10, 10; Ammianus Marc. XIV, 11, 26; XXVI, 8, 13; XXXI, 1, 1, etc.). They become common in the Middle Ages and the Renaissance, though we have also the ball of fortune (Kebes, *Pinax*, VII, 1). Cf. Tennyson, *Godiva*, "New men that in the flying of a wheel|Cry down the past." The symbolism of the wheel had attached itself to Nemesis and Tyche long before the third century B.C., when it is generally said to have started. Cf. *Jb. Arch.* I, XLVI, 1931, pp. 181 ff., for the Wheel of Fortune as associated with Δίκη and Τύχη (the same two deities as are perhaps mentioned in our mosaic). Our mosaic is the earliest representation in art of the Wheel of Fortune with the inscription, ἀγαθὴ τύχη.

² An additional argument against Gaebler's idea that the six Dikaïos tetradrachms found at Olynthos in 1931 and the two or three in private possession are forgeries is that a forger would not have imitated such a correct Olynthian name. It is possible that we should read in our mosaic Δικαίω on the analogy of Ἰασώ, Σωσώ, Δωρῶ (Arist. *Knights*, 529), etc. Pape, *Griechische Eigennamen*, gives such a feminine name (Leake, *Travels in Northern Greece*, No. 191-I.G. IX, 2, 156), on a gravestone. In our mosaic she might be a goddess of fair play like Dike or Dikaïosyne and in that case the Villa may have had a gambling parlor, especially since A might represent the best throw of dice, which was called Ἀφροδίτη (cf. Lucian, *Erotes*, 16, Ἀφροδίτην καλῆν). The arbiter bibendi was chosen by dice and the best throw was Aphrodite or Venus. Cf. Horace, *Odes*, 1, 4, 18 and II, 7, 25: quem Venus arbitrum|Dicet bibendi? The Dionysos mosaic with its dancing figures, the big krater in the entrance to the andron, and the two good luck inscriptions, as well as the dice-like square with Ἀφροδίτη καλή and the hand would then have special significance, if gambling and drinking and love-making were the specialties of the Villa.

³ Perhaps the parallel lines at the left below ΔΙΚΑΙΩ form another symbol and are meant to suggest a ladder, a symbol of an advance to higher fortune (*B.C.H.* LVI, 1932, pp. 410 ff.). Cf. Jacob's ladder in the Bible and the fact that bronze ladders are found in tombs. At Egyptian Thebes and Letopolis there were heavenly gates reached by a ladder. Pepi (ca. 2600 B.C.) is said to have entered the sky by a ladder.

⁴ Cf. Mau-Kelsey, *Pompeii*, p. 399, fig. 230.

above the head of the skeleton, whose feet rest on a wheel.¹ In Egypt and North Africa the figures who carry an A or a level are deities of death or they are connected with fertility.² On a Roman gravestone at Aquincum near Budapest an A is seen, but it is generally called a groma.³ On an inscription from Pisidian Antioch A stands for an only child.⁴ It often means "first," and at Olynthos must be a sign of good luck or of love (Aphrodite, whose name begins with alpha).⁵

In the andron, the main living room⁶ in the northwest corner of the house, is a raised border (width 0.90 m.) of painted yellow cement (Pl. XXVIII). In the central sunken area is a complete mosaic which contains some forty to fifty thousand pebbles, for the most part black and white (Pl. XXIX). In the central panel, enclosed within a border of ivy leaves, a youthful draped Dionysos is driving his biga drawn by two panthers; the box of the car and the reins are done in red pebbles. A winged Eros with a goad in his right hand flies above. A tall nude figure with two horns on his head and a kind of thyrsos in his left hand leads the way on the run, looking back. About the central scene is a border of dancing figures, maenads, satyrs, and a Pan, all facing away from the central design, in the earliest style. There are four figures above and four below the central scene, while at either end there are five. In front at the left (west) are two maenads running, each with a thyrsos in her raised right hand about to strike a hind between them; the maenad at the right holds a tambourine (?). Then follow at the right two dancing maenads, each with a thyrsos in the right hand; the first dancer appears to hold a tortoise, the second a tambourine. In the eastern panel a satyr plays the double flute while a maenad with thyrsos and tambourine dances toward him; between them is a duck. Then follow a hind, a dancing maenad with a stick in her right hand, a ham in her left. Toward her dance two other maenads. In the northern panel a maenad dances with a knife in her raised right hand, a tortoise in the left, while a second one, holding a stag by the horns, runs toward her. Next comes a group of two dancers facing one another, one with a thyrsos, the other with a thyrsos and kantharos. The scene continues on the west, where two maenads hold a hind suspended head downward between them, the one to the left about to plunge her knife into the animal. Next a horned and goat-legged Pan dances with a tambourine(?) in his left hand. Finally two maenads approach each other dancing, the one at the left holding a thyrsos and tortoise. The figure

¹ Cf. *B.C.H.* LVI, 1932, pp. 463 f., figs. 4, 11, Pl. XXVII. On the A symbol and its history to modern times cf. also *Röm. Mitt.* XLIX, 1934, pp. 157-179. A means *aequalitas* and as Claudian, *De raptu Proserpinae*, II, 302, says, *Omnia Mors aequat*.

² *B.C.H.*, l.c., p. 465.

³ *Ibid.*, p. 437.

⁴ Cf. Robinson, in *Anatolian Studies Presented to Sir William Ramsay*, pp. 346-353.

⁵ I am reminded of Hawthorne's *Scarlet Letter*, of Chaucer's Prioress (*Canterbury Tales*, Prologue, 161) who wore a brooch

"On which ther was firste write a crowned A,

And after, *Amor vincit omnia*";

and of Chaucer's *Troilus and Cressyde*, I, 25:

"Right as our firste lettre is now an A,

In beautee first so stooed she, makelees."

Perhaps in the *Troilus* the reference is to Queen Anne, the first head of the land. For symbol A cf. Lowes, *Publ. Mod. Lang. Ass.* XXIII, pp. 285 ff.

⁶ Again the walls are faced with white and red stucco, the red above, the white in a broad band at the base with a narrower band above it. The walls are preserved to a height of about 1.50 m.

composition is surrounded by two borders, the inner one consisting of oblique double palmettes,¹ the outer a wave pattern.

The design is worked out systematically in groups of twos and threes and reminds one of scenes on red-figured vases of the last quarter of the fifth century and the beginning of the fourth.² The mosaic is one of the earliest representations of the rites connected with Dionysos and the omophagia; the motives seen here become common on later vases, mirrors, and sarcophagi. There are two types of scenes on mosaics with representations of Dionysos, one where he himself rides a panther, as in two beautiful Hellenistic mosaics at Delos,³ the second where he appears in a chariot. Here we have the earliest example in mosaic of Dionysos in a chariot, the scene so well known from vases and sarcophagi. The wave patterns, the ivy pattern, panthers, scrolls, palmettes, all on the same diagonal and with the same general composition, seem to point to the fifth century in the case of this mosaic and the two to be considered next.

Ornamental patterns are more important than figure designs for dating. I believe that the mosaics date after 425 B.C., as the scenes are similar to those on vases of the Meidian school, but they do not necessarily belong to the fourth century B.C. The technique is that of the later fifth century free Greek style, as we also find it on the Bellerophon mosaic.⁴ One close fifth century parallel is found on a marble relief in Cassel with a scene of Artemis and a hind.⁵ The resemblance to the maenad with the thyrsos and the hind in front of her (lower left or south border) is so exact that one must be copied from the other, or both have a common source. Another good fifth century parallel in sculpture is a relief, the genuineness of which our mosaic confirms, in the collection of Duc de Loulé in Lisbon, where a nude male figure (often called wrongly an *apobates* who ought to be armed), with one leg thrown well back and head turned back, is running in front of a quadriga, in a pose similar to that of the figure in front of the car of Dionysos.⁶

In the entrance-way is a mosaic made of about eight thousand pebbles (Fig. 3). Within an ivy border stand two Pans, each with horns, bare breasts and body, and with goat's legs. They are dressed in a kind of tricot of goat's skin and stand stiffly

¹ Such a pattern occurs as early as the Brygos painter (Lau, *Die gr. Vasen*, Pl. XXX) and continues through the fifth century into the fourth (cf. Jacobsthal, *Ornamente griech. Vasen*, Pls. 60a, 61b, 74b, etc.).

² Cf. Furtwaengler-Reichhold, *Gr. Vas.*, Pl. 149; cf. No. 7 in the Vatican, an amphora with Dionysos in a chariot drawn by griffins. In the Museo di Villa Giulia is an Apulian krater (ca. 400 B.C.), with Dionysos in a red car drawn by two panthers; in his right hand are the reins, in his left a thyrsos. The panthers have red collars and are preceded by a tambourine dancer who is looking back. One is also reminded of the dancing maenads on a large Neo-Attic marble krater in Naples signed by Salpion of Athens and on the Sosibios vase in the Louvre which imitate fifth and fourth century poses. In the Ny Carlsberg Glyptothek in Copenhagen (No. 777) is a Roman sarcophagus with a representation of Dionysos in a chariot drawn by two panthers; about him are maenads, satyrs, and Pan. On a bronze mirror from Palestrina in the Museo di Villa Giulia, Dionysos is in a chariot drawn by three panthers and a winged victory flies towards him with a wreath.

³ Cf. Chamonard in *Exploration archéologique de Délos*, VIII, 1, p. 132, fig. 59; *B.C.H.* LIV, 1930, p. 513, fig. 37.

⁴ Cf. *Olynthus*, V, pp. 4 ff.

⁵ M. Bieber, *Ath. Mitt.* XXXV, 1910, pp. 9 ff., and Pl. II; *Jb. Arch. I.* XXIX, 1914, p. 136. Cf. also Bieber, *Die antiken Skulpturen und Bronzen in Cassel*, 1915, No. 74, pl. XXXII.

⁶ I know it from a cast in Berlin. Cf. Friederichs-Wolters, *Gipsabgüsse*, 1885, no. 1835; Kekulé, *Das akademische Kunstmuseum zu Bonn*, p. 105, nos. 414, 415; *B.C.H.* XVI, 1892, p. 325, Pls. 8-9; Reinach, *Répertoire de Reliefs*, III, p. 475. Cf. also for similar runner, *ibid.*, III, p. 94.

on tiptoe, leaning forward and with their hands thrown back, on either side of a large kalyn krater with high foot and two low handles. The duplication of a god at so early a period is rare, though common in Roman times. The decorative motive of a figure on either side of a vase or tablet can now be traced back to the fifth century, though Speier has nothing like it in "Zweifiguren Gruppen" in *Röm. Mitt.*, 1932, pp. 1-94.

In the corridor or portico facing the entrance is a long pebble mosaic, ca. 6.00 m. long by 3.00 m. wide (Pl. XXX). The main scene forms a narrow panel, bounded at either end by three fifth century palmettes and circles with crosses. There are three wide, beautiful borders around the panel, a wave pattern, a peculiar meander pattern with broken lines, crosses and rosettes, and an elaborate scroll pattern. At the left Achilles sits on a rock, with breast almost in front view, though the face is in profile. His left leg and hand are advanced, whereas the right foot is drawn back and his right hand rests on the rock which is nearly covered by his garment. Over his head is the inscription ΑΧΙΛΛΕΥΣ. Thetis approaches him. She is depicted in fine fifth century attitude, with flowing robes, her right hand extended in greeting. Before her, the inscription ΘΕ occurs, behind, ΤΙΣ. She is followed by two Nereids on sea-serpents, seated sideways and with legs crossed. The first has in her left hand a large shield with rays done in red pebbles. The second has a spear in her right hand; in her left, an Attic helmet with cheek pieces and a Phrygian crest to the front, partly in red. On the sea-serpents red pebbles are also used for the two continuous lines, but the dots are black. Most of the pebbles, however, are white or black, with a few yellow or green ones between the figures.

The scene confirms my interpretation of a large vase found at Olynthos,¹ where a nude seated figure was interpreted as Achilles. It is the Hesiodic or Aeschylean un-Homeric version of the story, as it was represented on the Corinthian chest of Kypselos, on which the Nereids, and not Thetis alone, as in Homer, bring the armor. The influence is probably Corinthian as in the Bellerophon and other Olynthian mosaics. This Achilles mosaic is less crowded than the Dionysos mosaic. The composition is restrained, dignified, and has rhythm and symmetry. All details of anatomy are worked out by lines of black pebbles. The designs remind one of red-figured vases from the end of the fifth century, such as F69 in the British Museum,² where on one side we have Thetis and the Nereids on sea-serpents and on the other a Dionysiac scene (the same combination of subjects as on our mosaic). But the remarkable thing is the influence of fifth century sculpture, where, as on the frieze from the fifth century Ionic temple by the Ilissos we have seated figures.³ It almost seems as if the artist of this mosaic had been influenced by the east pediment of the Parthenon. The Thetis recalls in attitude a maiden with raised right hand who stands to the left of the priest on the east frieze of the Parthenon.⁴ Achilles and Thetis are quite like the Apollo and the Hera and Athena on the Altar of the Twelve Gods in Athens.⁵ Apollo has the lyre in his left hand, but the position of the nude body, of the

¹ *Olynthos*, V, pp. 109-115, where many parallels and the literature are cited.

² *Cat. of the Vases in the Brit. Mus.*, IV, p. 46.

³ Blümel, *Katalog der griech. Skulpturen*, Berlin 1928, Pl. 22.

⁴ Smith, *Sculptures of the Parthenon* (British Museum), Pl. 35. Cf. *Röm. Mitt.*, 1932, Pl. 13, 2 (405 B.C.).

⁵ Cf. *Ath. Mitt.*, IV, 1879, Pl. XX, pp. 340-42, where other Apollos are cited; also Carpenter, *Hesperia*,



FIG. 3.—PEBBLE MOSAIC. A PAN ON EITHER SIDE OF A KRATER

feet, and the rock with the drapery on it are very similar. Hera wears the same sort of drapery and has the same pose and Athena holds her right hand in the same way as Thetis.

The motive of a seated male with a female figure facing is common and often occurs on vases of the fifth and fourth centuries,¹ but the resemblance to the Parthenon figures is so great that it seems the artist knew the Parthenon² and made the mosaic in the last quarter of the fifth century. The discovery of three contiguous Hellenic mosaics of such excellence is unique. Though done in natural pebbles, they

II, 1933, pp. 22 ff., fig. 3, pp. 70 ff., p. 79, fig. 29, Pl. II, 17, 18. P. 77, fig. 28 illustrates an Attic relief from Chalkidike (possibly from near Olynthos), now in Copenhagen, with a fifth century type of Athena which recalls our Thetis in pose and gestures.

¹ Cf. for examples, *C.V.A., Collection Mouret*, Pls. 1-4, and *Ausonia*, IV, 1910, p. 151, fig. 17 (fourth century); one is also reminded of scenes representing the Judgement of Paris; cf. *A.J.A.* XIX, 1915, Pls. XXIX-XXX; *J.H.S.*, VII, 1886, pp. 200 ff., and figs. on p. 204, type C; *C.V.A., British Museum*, III, I C, Pls. 48, 1 a; 51, 2; 81, 3; also Odysseus in Furtwaengler-Reichhold, *Gr. Vas.*, Pl. 64.

² For other cases of the influence of the Parthenon cf. *Olynthos*, IV, pp. 65 f., nos. 358-359 (ikons of the Athena Parthenos); V, p. 94, no. 107; pp. 96 ff., no. 112.

have a life, beauty, and rhythm which are lacking in many more mechanical Roman and Byzantine mosaics. Considering the material, the drawing and composition are excellent and I cannot agree with my friend Professor Patroni that the art is a poor one.¹

The sixth mosaic (6 by 8 m.) of the 1934 campaign was found in the court of House A xi 9 (Pl. XXXI). Constructed in the usual Olynthian technique with black and white pebbles, its design is the result of wild imagination. Scattered about in exotic confusion are chevrons, a double axe, concentric circles and circles within squares, wheels of fortune, irregular designs of various sorts, and, most frequently recurring of all, the swastikas, some enclosed in circles, some in squares, and some standing alone.² Such a modernistic Picasso-like freedom in art and such a helter-skelter hodge-podge, reminding one somewhat of the later Roman mosaic depicting an unswept floor, is something new in pre-Hellenistic Greek art and is a revelation of the varied versatility of the Greek.

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¹ Cf. Patroni, *Athenaeum*, N.S.XII, 1934, pp. 162 ff.

² On the swastika, which was a solar symbol, cf. Thomas Wilson, *The Swastika*, Report of the National Museum, Washington, 1894, pp. 757-1011 (good bibliography); A. B. Cook, *Zeus*, I, pp. 299 ff., and pp. 336 ff.; W. N. Brown, *The Swastika*, New York, 1933; Dumont, *J.A.O.S.* LIII, 1933, pp. 332-334.

A NEW INSCRIPTION OF JERASH

THE excavations conducted in the spring of 1931 at Jerash, in Transjordan, by Yale University and the American School of Oriental Research in Jerusalem, brought to light an epigraphical monument which makes it possible to restore with certainty another inscription of prime importance, first published by Père Germer-Durand in *Revue Biblique*, VIII, 1899, pp. 5-7. The new inscription is an almost exact copy of the one already known, but is much better preserved and gives five additional lines, making a complete text of eleven lines. Since we have had access only to a photograph and a squeeze of the stone, we can give but an approximate description of it. The inscribed surface measures 76.9 cm. x 38.5 cm., and is surrounded by a moulding



FIG. 1.—THE INSCRIPTION FROM JERASH

approximately 9 cm. wide, which projects over the inscribed surface. The slab is broken in three well-fitting pieces. On the left side is a square hole about 18 cm. to the side, cut probably by the workman who used the stone in the building of a later house wall. A piece forming the upper left part of the slab is missing. Both right-hand corners of the moulding are damaged.

The letters are of the square type, with the exception of the Ω , the bottom wings of which join the central loop with a rounded angle. Also, the strokes of the Ξ are curved. The cross hastae of the H and Θ and the center hasta of the E are not joined to the perpendicular strokes of the letters. In the first three lines, these hastae are thickened at both ends. The cross hasta of the A is broken. The height of the letters

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in the first line is 3.5 cm.; in the next two lines, 2.7 cm.; and in the remaining, 2.5 cm., the last three letters being only 2 cm. high. All the letters of the first three lines seem to be cut more deeply than the others. The first, fourth, and seventh lines do not reach the edge of the moulding at the right. The last line has a long blank space at the right and left, the space at the right being longer. The letters are evenly spaced throughout, except in the seventh line, where a blank appears between the τ of $\delta\eta\mu\omicron\nu$ and the ϵ of $\epsilon\kappa\tau\iota\sigma\theta\eta$.

The inscription was found near the northwest end of the forum. A photograph and translation were published by Fisher in the *B.A.S.O.R.* 45, 1932, p. 6.¹

The text of the new inscription, with restorations, is as follows:

[αγαθ]Η ΤΤΧΗ ΕΤΟΤΣ ΘΚΡ ΤΗΡ
[της σεβ]ΑΣΤΗΣ ΕΙΡΗΝΗΣ ΕΠΙ ΤΗΣ ΑΡΧ
[ης απολλ]ΩΝΙΟΥ ΗΦΑΙΤΙΩΝΟΣ ΠΡΟΕΔΡΟΥ
[και μαλχα]ΙΟΥ ΔΗΜΗΤΡΙΟΥ ΔΕΚΑΠΡΩΤΟΥ
5 [της πολε]ΩΣ ΚΑΙ ΑΝΤΙΟΧΟΥ ΑΡΙΣΤΩΝΟΣ
[αρχοντω]Ν ΚΑΙ ΞΕΡΞΟΥ ΧΑΙΡΕΟΥ ΓΡΑΜ
ΜΑ[τεως β]ΟΤΑΗΣ ΚΑΙ ΔΗΜΟΥ ΕΚΤΙΣ
ΘΗ [το τειχ]ΟΣ ΕΚ ΤΩΝ ΤΗΣ ΠΟΛΕΩΣ
ΔΙΑ ΕΠΙΜ[ε]ΔΗΤΩΝ ΜΕΛΙΤΩΝΟΣ ΑΠΟΛΛΩ
10 ΝΙΔΟΥ ΤΟΥ ΚΑΙ ΝΙΚΑΝΟΡΟΣ ΚΑΙ ΤΙΜΑΡΧΟΥ
[τ]ΟΥ ΑΥΣΙΜΑΧΟΥ

Translation: To Good Fortune. In the year 129. For the preservation of the Pax Augusta, under the chief magistracy of the president, Apollonius, son of "Hephaition," and Malchaïos, the *dekaprotos* of the city, son of Demetrius, and Antiochus, one of the magistrates, son of Ariston, and Xerxes, secretary of the senate and popular assembly, son of Chaireas, this wall was set up at the city's expense by the curators Meliton, called also Nicanor, son of Apollonides, and Timarchus, son of Lysimachus.

The previously-known inscription was first published, as noted above, by Germer-Durand in 1899. It was later published by H. Lucas,² by W. Dittenberger,³ and in *Inscriptiones Graecae ad Res Romanas Pertinentes*, Vol. III, p. 486, no. 1376. It was found in the region of the South Gate of Jerash. According to Lucas, it is 84.5 cm. x 52.5 cm. The letters measure, according to Germer-Durand, 5.5 cm.; according to Lucas, 4¼–4½ cm.

This inscription may now be restored, in the light of our new evidence, as follows:

[Ἀγαθῇ τύχῃ]η· Ἔτους θκρ·
[Τέρτῃ]ς Σεβαστῆς Εἰρήν[η]ς·
[Ἐπὶ τῇ]ς ἀρχῆς Ἀπολλωνίου[υ]
[Ἡφαισ]τίωνος προέδρου καὶ
5 [Μαλχαί]ου Δημητρίου δεκαπρω[ώτου]
[διὰ β]ίου πόλεως καὶ Ἀντιόχ[ου]

¹ There is a very brief discussion of the new inscription by Prof. McCown, "New Inscriptions from Jerash," *B.A.S.O.R.*, 49, 1933, pp. 7–8.

² *Mittheilungen und Nachrichten des Deutschen Palaestina-Vereins*, 1901, pp. 43–44, no. 8, and p. 73, no. 70.

³ *Orientalis Graeci Inscriptiones Selectae*, Vol. II, pp. 316–17, no. 621.

[Ἀρίστ]ωνος ἀρχόντων καὶ Ξέρ-
[ξου Χ]αίρεον γραμματέ[ως. . . .

Ἀγαθῇ τύχῃ This formula of good wish was frequently used in Greek inscriptions after it had become usual in Athens in the third century B.C.¹ It occurs often in the inscriptions of Jerash. The stonecutter omitted the iota-adscrip of Ἀγαθῇ.

Ἔτους θ'κρ This is the year 129. Various interpretations, however, have been given to this date in the older inscription, in accordance with the different eras suggested as the basis for computation. P. Germer-Durand in his original publication proposed to restore ἀπό immediately after θ'κρ, and proceeded to reckon 129 years from the Σεβαστῇ Εἰρήνῃ. This he took to indicate the era of Actium, beginning in 31 B.C.; he thus arrived at 98 A.D. as the time of the inscription. He was followed by Lucas, by the editors of the *Inscriptiones Graecae ad Res Romanas Pertinentes*, and by Brünnow and Domaszewski.² Dittenberger, however, reckoned the date from 9 B.C., the year in which an altar was erected in the Campus Martius at Rome to Pax Augusta, and thus suggested 120 A.D.³ Soon after Germer-Durand's publication, Kubitschek, in a study of the eras of Medaba and Gerasa, proposed to restore ὑπέρ instead of ἀπό, and computed the date by the Pompeian era.⁴ Most of the editors after him seem to have been ignorant of, or at least to have ignored, this suggestion, although it was adopted by Schwartz⁵ and Schürer.⁶ The finding of the new inscription verifies the conjecture of Kubitschek as against that of Germer-Durand. It is entirely unnecessary to determine the date from the Σεβαστῇ Εἰρήνῃ.

We must, therefore, reckon the date by the Pompeian era. It has been shown that this was in general use at Gerasa,⁷ and that it was not a so-called provincial era imposed by the Roman senate, but was probably adopted voluntarily by the city to mark the freedom given it by Pompey.⁸ This liberty era of Jerash began in the fall of 63-62 B.C. Accordingly, our inscription belongs to the year 66-67 A.D., the thirteenth year of Nero's rule.

ὑπέρ τῆς Σεβαστῆς Εἰρήνης. The phrase has nothing to do with the preceding date. It is simply a formula of invocation. ὑπέρ used in this augural sense was common by the time of the Lagids⁹ and appears also on Seleucid and Attalid monuments.¹⁰ In Roman times it was used frequently in the same sense in inscriptions of the Eastern provinces.¹¹ The formula in its fullness is ὑπέρ σωτηρίας (or a similar word) τοῦ δέλου. Sometimes it is abbreviated to ὑπέρ τοῦ δέλου, as in our inscription. In such cases a word like σωτηρία is evidently implied.

¹ Larfeld, *Handbuch der griechischen Epigraphik*, Vol. I, pp. 437-38; Vol. II, pp. 592-93.

² *Die Provincia Arabia*, 1909, Vol. III, pp. 297, 303-04, 310.

³ *Op. cit.*, Vol. II, p. 317.

⁴ "Die Mosaikkarte Palästinas—Anhang I: Die Aeren von Medaba und von Gerasa," *Mittheilungen der Kais. Königl. Geographischen Gesellschaft in Wien*, XLIII, 1900, p. 370.

⁵ "Die Aeren von Gerasa und Eleutheropolis," *Nachrichten von der Kgl. Ges. der Wiss. zu Göttingen*, Phil.-hist. Klasse, 1906, p. 362.

⁶ *Geschichte des Jüdischen Volkes im Zeitalter Jesu Christi*, 4th ed., 1907, Vol. II, p. 183 note.

⁷ Schwartz, *op. cit.*, pp. 362 ff.

⁸ Kubitschek, "Ueber die Pompeius-Aera in Syrien," *Arch.-Epigr. Mitt. aus Oest.-Ungarn*, XIII, 1890, pp. 200-09.

⁹ *Orientis Graeci Inscriptiones Selectae*, I, nos. 21, 28, 29, 64, 65, 83-89.

¹⁰ *Ibid.*, I, nos. 251, 301-04.

¹¹ *Ibid.*, II, nos. 606, 607, 611, 614, 615, 618, 622, 628, 663.

The number of epigraphical monuments bearing a pious wish for the Σεβαστὴ Ειρήνη is so small that we should hesitate to include this formula among those whose meaning is of a stereotyped nature.¹ It seems to indicate some specific event. This has been shown conclusively by Professor M. Rostovtzeff in the case of the Σεβαστὴ Ειρήνη referred to in the famous letter of Claudius to the Alexandrians and of the Ειρήνη figure appearing on Claudian coins. In this instance the goddess symbolizes the successful quelling of serious Jewish riots in Alexandria.² We venture to suggest that the formula in the present inscription is equally specific, and that it reflects the following historical events:

In the year 60 A.D., on Nero's order, Corbulo set the Cappadocian prince Tigranes on the Armenian throne after expelling from it the Arsacid prince Tiridates, brother of the Parthian king Vologesus.³ The dethroned king, however, refused to submit to the imperial order, and engaged in a long struggle against Nero's troops to regain his kingdom. The fighting was protracted into the year 63, but in the end Nero consented to return the royal diadem to Tiridates with the stipulation that he should receive it in Rome from the Emperor's own hands.⁴ It was, however, not until the year 65, and then only *magnis pollicitationibus sollicitatum*, as Suetonius remarks,⁵ that Tiridates set out for Rome.⁶ After the crowning of Tiridates and a magnificent spectacle in his honor, Nero was acclaimed *Imperator*, and furthermore, *laurea in Capitolium lata, Janum geminum clausit, tam nullo quam residuo bello*, as Suetonius informs us.⁷

Tiridates seems to have reached the capital not earlier than the year 66, for not only does Cassius Dio report that he consumed nine months in his journey,⁸ but also in the *Acta Fratrum Arvalium* there appears an entry for the year 66 which is highly interesting in the light of the events just mentioned.⁹ It is there recorded that to Jupiter a bull was sacrificed, to Juno and Minerva each a cow, to Jupiter Victor a bull, to Pax and another goddess whose name does not appear each a cow *ob laurum* [*imperatoris Neronis, etc.*]. The sacrifice to Jupiter Victor and to the Dea Pax for a laurum of the Emperor refers obviously to the deposition of the "laurea" in the Capitol and the closing of the Janus temple on the occasion of Tiridates' visit of which Suetonius speaks. The crowning at Rome of Tiridates represented a diplomatic victory for Nero, and peace was thereby re-established in the Empire.¹⁰

The Janus temple, however, had already been closed in the previous year, in 65, as some coins of that year attest, bearing on the reverse a representation of the

¹ *Inscriptiones Graecae ad Res Romanas Pertinentes*, IV, no. 1173; *Orientis Graeci Inscriptiones Selectae*, II, no. 663, mentions the Ειρήνη of Emperor Claudius, which must be identified with the Σεβαστὴ Ειρήνη in general. Cf. *Inscriptiones Latinae Selectae*, II, no. 5883, which is bilingual.

² M. Rostovtzeff, "Pax Augusta Claudiana," *J.E.A.* XII, 1926, pp. 24-28. In this case the subject is the figurative representation of the Dea Pax, but it belongs in the same category as our inscriptional mention of the goddess.

³ Tacitus, *Annals*, XIV, 26.

⁴ *Ibid.*, XV, 1-18; 24-31.

⁵ Suetonius, *Nero*, 13.

⁶ Cf. Cassius Dio, LXIII, 1-7, for the splendid journey of the prince and his reception in Rome.

⁷ *Nero*, 14.

⁸ Cassius Dio, LXIII, 2.

⁹ Henzen, *Acta Fratrum Arvalium*, 1874, p. lxxxi.

¹⁰ Cf. the coins commemorating the closing of the Janus temple in 66: Cohen, *Description historique des monnaies frappées sous l'Empire Romain communément appelées médailles impériales* 2nd ed., 1880, Vol. I, Nero, nos. 139, 140, 169, and Mattingly, *Coins of the Roman Empire in the British Museum*, 1923, Vol. I, Nero, no. 113. We are referring here only to dated coins.

closed temple.¹ As far as we can judge from the reports of the ancient historians, there was no good reason for the performance of this ceremony in that year, for it was in the latter part of 63, when the war with Tiridates had already ended, that this prince, instead of going to Rome for his coronation, assumed the diadem before the standards of the Roman legions and the imperial images, as if to show that, although he was rendering homage, he was still independent from Rome.² We are, therefore, surprised to find that the Janus temple apparently remained open throughout the year 64, when we should expect the closing ceremony to have taken place, in view of the fortuitous events in Armenia. Henderson's assumption that the temple was closed in 64 must be rejected for lack of sufficient evidence.³ We venture to suggest that the catastrophic fire which Rome suffered in the summer of that year prevented the accomplishing of the solemn act which had, therefore, to be deferred to the following year.⁴

When Tiridates was finally persuaded to journey to Rome to make obeisance to the Emperor and receive the diadem from his hands, the pompous festivities of 66 in connection with his act of submission were evidently crowned by a repetition of the fitting ceremony of closing the doors of war.

These, then, are the events which occasioned the mention of the Σεβαστὴ Ειρήνη of our inscription. It is interesting to notice that it does not reflect the Roman victory over Tiridates,—for the diplomacy and arms of Rome were frequently victorious,—but instead the much rarer celebration of peace. This consideration seemingly explains why the Σεβαστὴ Ειρήνη does not appear more often.

The suggestion might, perhaps, be advanced that the mention of the Σεβαστὴ Ειρήνη was inspired by the Jewish revolt which began in August, 66 A.D., with the treacherous murder of the Roman garrison in Jerusalem.⁵ The ensuing pogroms and reprisals may easily have called forth a wish for the preservation of the peace, especially since Jerash was not spared by the Jewish violence.⁶

It must be noticed, however, that two important factors speak against this assumption. Since the year 1 of the Pompeian era began in the autumn, the period between the outbreak of the revolt to the end of the year would at most contain the months from October to December inclusive. During these months the Jewish rebellion must have been in full progress, so that one would scarcely expect a city to put up building inscriptions with good wishes for the Pax Augusta during a

¹ Cohen, *op. cit.*, I, Nero, no. 143; Mattingly, *op. cit.*, I, Nero, nos. 111, 112. In a note on these coins Mattingly suggests that they were minted in December, 63.

² Tacitus, *Annals*, XV, 29-31.

³ B. E. Henderson, *The Life and Principate of the Emperor Nero*, 1903, p. 191. Mattingly, *op. cit.*, Vol. I, Introduction, p. clxiv, remarks, however, that undated coins bearing a picture of the closed Janus temple might belong to the year 64 on account of the special design of Nero's head on the *recto*. We do not consider this conclusive evidence. The *aes* no. 20 of Gabrici, "La Cronologia delle Monete di Nerone," *Rivista Italiana di Numismatica*, 1897, pp. 278-79, with *rev.* closed Janus temple and *obr.* TR POT XI might well belong to the earliest part of 65; cf. Cagnat, *Cours d'Épigraphie Latine*³, 1914, p. 187.

⁴ Tacitus, *Annals*, XV, 38-41.

⁵ Josephus, *Bellum Judaicum*, II, xvii, 449-56. Mr. H. St. J. Thackeray in his English translation of Josephus points out in a note to this passage that the massacre perhaps occurred in the month Gorpiaeus, basing his view on the evidence of the old Jewish calendar *Megillath Taanith*, vi. (b) in Zeitlin's edition, Philadelphia, 1922. We owe the considerations about the Jewish revolt to Mr. R. O. Fink, who drew our attention to this aspect of the question.

⁶ Josephus, *Bellum Judaicum*, II, xviii, 457-60.

virulent racial war. This argument, however, does not weigh as heavily against the proposal as the fact established by Professor Rostovtzeff and, as we hope, by ourselves, that the Pax Augusta is recorded only when actual peace has been achieved for the Empire. The preservation of the Σεβαστὴ Εἰρήνη presupposes a state of peace which it is hoped will be continued, and not a state of war. The latter calls for a wish for victory rather than for the preservation of peace. It is beyond dispute, at any rate, that the figurative and inscriptional references to the Pax Augusta coincide with the establishment of peace by the Emperor and that they are not motivated by wishes for peace of local inspiration.¹

At this point we should like to draw attention to a striking circumstance in our inscription, before entering into a detailed examination of the following lines. The wall whose construction is recorded has evidently been set up in virtue of a decree of four magistrates and not, as we might expect in a city with Hellenistic traditions, by following suit to a decision of βουλή and ἐκκλησία. It appears, furthermore, that those four officials are of highest rank, as we shall see, and that two of them, the δεκάπρωτος and the ἄρχων, belong to a body of officials bearing the same title which they seem to represent in the group of four. It is then clearly apparent that this group or college of four is formed by the most influential magistrates, and that it has usurped certain important rights of βουλή and δῆμος. An association of magistrates with such characteristics represents a συναρχία which is a college with definite political functions and which leaves the details of municipal administration to the magistrates under them.²

Ἐπὶ τῆς ἀρχῆς Ἀπολλωνίου Ἰφαιτίωνος προέδρου. The preposition ἐπὶ governs the four following names of magistrates who are distinguished by the designation of their respective offices, but indicates the year with reference to the archonship of Apollonius only.³ He is accordingly eponymous magistrate. We suggest that the unknown form of his father's name, Ἰφαιτίων is due to an error of the stonecutter, who meant to incise the name Ἰφαιστίων.

The date of the archonship is of local character, as distinguished from the regional date after the Pompeian era. This type of double dating became fairly common in the leagues of the Hellenistic period and in cities under Hellenistic rulers.⁴

The eponymous magistracy continued to exist also under Roman administration, for, as Chapot remarks,⁵ it flattered municipal pride. The title of the magistrate by whom the year was dated varied according to locality and period, and his position did not always represent the highest office, especially in the Greek Orient.⁶

In the case of Apollonius, however, it is evident that he holds the highest office; he is not only invested with the ἀρχή,⁷ but his title πρόεδρος shows clearly that he holds a

¹ Cf. M. Rostovtzeff, *J.E.A.* XII, 1926, pp. 24–28.

² Lévy, "Études sur la Vie Municipale de l'Asie Mineure," *Revue des Études Grecques*, XII, 1899, pp. 269–71.

³ Chapot, *La Province Romaine Proconsulaire d'Asie*, 1904, p. 236, note 1. We were not able to consult on this point Clemens Gnädinger's Strassburg dissertation, 1892, *De Graecorum Magistratibus Eponymis Quaestiones Epigraphicae Selectae*, and accept unreservedly Chapot's judgment on this question.

⁴ Cf. Lévy, *op. cit.*, pp. 271–72. For the evidence, see Larfeld, *op. cit.*, I, pp. 466–71, especially pp. 470–71.

⁵ Chapot, *op. cit.*, p. 236.

⁶ *Ibid.*, pp. 236–37.

⁷ We are aware that Aristotle's definition of the ἀρχή ἀρχὰς λεγέον τὰς δόξαις ἀποδίδοται βουλευσασθαι

power somewhat superior to that of his colleagues. It may be of interest to point out in this connection that the *πρόεδρος* remained eponymous in Jerash for a considerable period. A Gerasene inscription which Jones declares cannot be earlier than the third century mentions a certain Symmachos who is eponymous *πρόεδρος*.¹ In the year 258, however, there appears an eponymous secretary.² This evidence may indicate that the *προεδρία* ceased to be eponymous about that time.

The title *πρόεδρος* for the magistrate who gave his name to the year seems to have been in general use in Syria during the first two centuries of our era. It is attested for Bostra by an inscription which Waddington places either in the year 143 or in 199 A.D.³ and for Palmyra by the famous tariff law of 137 A.D.⁴

καὶ Μαλχαίου Δημητρίου δεκαπρώτου τῆς πόλεως. The restoration Μαλχαίου must be, of course, only conjectural. The top of what was probably an iota appears before the extant ending *ου*. The name Μαλκίας would perhaps fit the requirements of the space slightly better, but it is found in only one other inscription of Jerash, where the reading is quite uncertain.⁵ The name which we have restored is more common in Jerash and in Syria in general.⁶

The origin of the *δεκάπρωτοι* has remained in the dark despite the attention which eminent scholars have devoted to the subject. In a detailed study entitled "Decemprimat und Dekaprotie,"⁷ O. Seeck has set forth the view that the office of the Decaprotie was a Roman institution. He is led to this conclusion mainly by the circumstance that no text or epigraphical monument reports the Decaprotie before Roman times.⁸ Its earliest mention occurs on our stone. Since, however, the *δεκάπρωτοι* were concerned with the collection of taxes farmed out by the government, and since officials with similar duties existed before Rome's advent in the Orient, it is not unreasonable to assume a Hellenistic origin of these officials. If the Romans found a suitable organization to deal with taxation when they took over the East, one would expect that they would not discard it for innovations of uncertain expediency under untried conditions.

In regard to this problem we may point out certain conclusions which Professor M. Rostovtzeff has reached in a survey of tax-farming.⁹

The *Lex Hieronica* of Sicily, with which we are partially acquainted through Cicero's *Verrines*, is shown to be practically identical with the Revenue Laws of Ptolemy Philadelphus. A proof is, therefore, furnished that in the case of Sicily

τε περὶ τινῶν καὶ κρίναι καὶ ἐπιτάξει (*Politica*, VI, 15, 1299a, 3rd ed. of Susemihl) cannot safely be applied to the period and place of our inscription, but the title *πρόεδρος* linked with the *ἀρχή* supports our view. Cf. Chapot, *op. cit.*, p. 238, on this point.

¹ A. H. M. Jones, "Some Inscriptions from Jerash," *Quarterly Statement of the Palestine Exploration Fund*, 1928, p. 193.

² H. Lucas, "Repertorium der griechischen Inschriften aus Gerasa," *Mitteilungen und Nachrichten des Deutschen Palaestina-Vereins*, 1901, p. 54, no. 14. Further references to Lucas by number will be to the inscriptions of this article.

³ Waddington, *Inscriptions Grecques et Latines de la Syrie*, 1870, no. 1907. The date is determined by the mention of a certain *Φρόντων*, who is *ἐκρίστος ἡγεμῶν*. Cf. Dessau, *Prosopographia Imperii Romani*, Vol. II, p. 88, no. 325.

⁴ *Corpus Inscriptionum Semiticarum*, Pars Secunda, III, 1, no. 3913.

⁵ Lucas, *op. cit.*, no. 7.

⁶ *Ibid.*, nos. 14 and 69; and Waddington, *op. cit.*, no. 2413j.

⁷ *Klio*, I, 1901, pp. 147-187.

⁸ *Ibid.*, p. 151.

⁹ M. Rostovtzeff, *Geschichte der Staatspacht in der römischen Kaiserzeit bis Diokletian*, 1902.

Hellenistic institutions were adopted by the Roman administration. Sicily, however, differed from Egypt by the autonomous state of her πόλεις. In Cicero's time the Sicilian cities appear themselves as tax-farmers.¹ Certain city officials, the Magistratus Siculi,² who were perhaps the Decemprimi and Quinqueprimi of Cicero's *Verrines*, II, 162 and III, 68, seem to have played the roll of the middle-man between the tax-farmers and the citizenry.

The tax system prevailing in the empires of the Seleucids and Attalids is shown to be similar to the one used in Sicily. In this case the resemblance is more striking than in the comparison between Egypt and Sicily, for, as in Sicily, the Eastern πόλεις enjoyed a certain autonomy. The interesting conclusion which Professor Rostovtzeff is led to make is that the organization of the Roman Fiscus in the East is most probably based on the Hellenistic system, of which the Romans adopted the main outlines.³

The earliest mention of tax-farming in Syria and Palestine is made by Josephus in the story of the tax-farmer Josephus.⁴ It appears there that the cities of Coele-Syria and Judaea which formed at that time (in the third century B.C.) an Egyptian province⁵ sent their πρώτοι καὶ ἄρχοντες to Alexandria yearly to make bids for the taxes. These Hellenistic officials were evidently not abolished when Rome inherited the East, for in Roman times the taxes of the πόλεις were directly farmed out to their own special organizations, which in turn came to agreements about the payments with the Roman Publicani.⁶

We may conclude, then, that the δεκάπρωτοι had duties similar to those of the Hellenistic city officials connected with the revenue, and that they were in this respect not unlike the Magistratus Siculi mentioned above. We are inclined to believe that these δεκάπρωτοι were Roman officials who took over the functions of their Hellenistic predecessors, because their title looks very much like a translation of *decemprimus*, a title already known under Sulla,⁷ and also because they discharged, as we shall see, additional duties which were perhaps a purely Roman enlargement of their office.

Epigraphical evidence shows that the δεκάπρωτοι kept their office for a varying number of years or for life.⁸ There is no proof that they were ever annual magistrates. This long tenure of office was made necessary by the circumstance that the main prerequisite to be met by the prospective decaprote was wealth.⁹ It is, therefore, plausible that Seeck should regard some citizens of Tiberias as *decaprote*s when Josephus calls them δέκα τῶν Τιβερίων οἱ δυνατώτατοι.¹⁰

Referring to the financial status of the δεκάπρωτοι, Seeck remarks in connection with the above passage that an office requiring a man with a personal qualification such as wealth cannot reasonably be filled by majority vote or by lot, but only by appointment, since wealth does not depend upon popular favor or chance. He sees in this a proof for the long office tenure, for a yearly elected body of officials could not possibly always contain the most influential citizens.¹¹

¹ M. Rostovtzeff, *Geschichte der Staatspacht in der römischen Kaiserzeit bis Diokletian*, pp. 354 ff.

² *Verrines*, III, 34.

³ *Geschichte der Staatspacht*, pp. 356-67.

⁴ *Antiquitates Judaicae*, XII, iv, 3.

⁵ Schürer, *op. cit.*, Vol. II, pp. 98-100.

⁶ Rostovtzeff, *Geschichte der Staatspacht*, pp. 357 ff.

⁷ Cicero, *Pro Sex. Roscio Amerino*, IX, 26.

⁸ Seeck, *op. cit.*, pp. 151-3. Cf. Germer-Durand's inscription above.

⁹ Cf. M. Rostovtzeff, *Gesellschaft und Wirtschaft im römischen Kaiserreich*, 1930, Vol. II, pp. 102-04.

¹⁰ *Bellum Judaicum*, II, xxi, 639.

¹¹ Seeck, *op. cit.*, p. 152.

The lifelong tenure of office, as it appears in the inscription published by Germer-Durand, seems, however, not to have been the rule. At least, one may plausibly infer from the forms *στρατηγήσας* and *γραμματεύσας* appearing in inscriptions and referring to yearly offices, that the frequent aorist form *δεκαπρωτεύσας* does not always refer to dead officials.¹

It has been demonstrated that it was in the province of the decaprotos to superintend the *πολιτογραφία*,—that is, the census.² To be sure, this duty does not appear to be connected with the decaprotos in inscriptions dating earlier than the third century, but Seeck believes that “in manchen [griechischen Provinzen] fielen Politographie und Dekaprotie wohl von Anfang an zusammen.”³ It is, then, not improbable that the Gerasene decaprotos of Nero's time were managing the census.

It is interesting to notice that the Gerasene decaprotos took part in the deliberations of the *βουλή* in a manner similar to the Italic *decemprimi*.⁴ This is, at least, attested for the third century. A Gerasene inscription from the time of Maximinus (235–38) mentions one Marcus Aurelius Solon who was *βουλευτής τῶν πρώτων*.⁵ This must certainly mean that he was listed among the first in the senatorial album, and it is fairly certain that the names at the head of these lists represent the *δεκάπρωτοι*.⁶ In view of this evidence, one may plausibly apply to Jerash Wilcken's opinion about the Egyptian *δεκάπρωτοι*, that they were always connected with the *βουλή*, even if this circumstance chanced not to be mentioned.⁷ One may, therefore, assume also for Jerash, to quote the words of Seeck, “dass, wenn ein wichtiger Gegenstand der Gesamtheit des Ordo [senatorial] vorgelegt werden sollte, sie [the decaprotos] unter sich zusammentraten und ihn nach Art einer Kommission vorbereiteten.”⁸

It appears so far, then, that our *δεκάπρωτος* represented in the Synarchy a college of rich senators engaged in tax-farming for Jerash and probably superintending the census, as well as exerting a decisive influence in the *βουλή*.

There is sufficient material to reconstruct the financial operations of the decaprotos of a later time,⁹ but for the period of our inscription, the information is too scant to warrant a detailed picture of their activities in this field. It is, however, reasonable to suppose that the activities of first-century *δεκάπρωτοι* were fundamentally the same as those of their successors.

It appears that the later officials had the duty of collecting such *tributa* as were expected to be turned over to the imperial treasury every year.¹⁰ The characteristic of these taxes was their fixed amount, in respect both to the sum payable by each town and to the individual contribution allotted to each citizen. From these circumstances it follows that, if the population and wealth of a town increased, a sum in excess of the required tribute would be collected, but that in the opposite case the fixed tribute would show a deficit. It was the duty of the *δεκάπρωτοι* to make up for the balance which they failed to collect. It now becomes evident why only men of means could fill the office.

¹ Seeck, *op. cit.*, pp. 152–53.

² *Ibid.*, pp. 157–60.

³ *Ibid.*, p. 160.

⁴ *Ibid.*, pp. 154–55.

⁵ A. H. M. Jones, “Inscriptions from Jerash,” *J.R.S.* XVIII, 1928, p. 166, no. 32.

⁶ Cf. Seeck, *op. cit.*, p. 154.

⁷ Wilcken, *Griechische Ostraka aus Aegypten und Nubien*, 1899, I, p. 626.

⁸ Seeck, *op. cit.*, p. 166.

⁹ Rostovtzeff, *Geschichte der Staatspacht*, pp. 417 ff.

¹⁰ Seeck, *op. cit.*, pp. 173–78.

καὶ Ἀντιόχου Ἀρίστωνος ἀρχόντων Antiochus seems to represent other ἀρχοντες in the Synarchy, and is, therefore, to be regarded as the most important member of this group of magistrates. Just what competences the term ἀρχων covers in this instance must, we fear, remain doubtful. Chapot has remarked, "On constate à l'époque romaine une certaine confusion dans les titres des magistrats municipaux. . . . L'habitude s'est prise un peu partout d'appeler οἱ ἀρχοντες l'ensemble des magistrats d'une municipalité."¹ We may add that Aristotle had termed, on one occasion at least, the Athenian magistracies αἱ ἀρχαί, embracing evidently all public offices with this term.² We venture to state, then, that the term ἀρχων does not necessarily designate a higher magistrate, and that in our inscription it probably refers to a group of administrators under the direction of Antiochus.

Between this mention of ἀρχοντες and the following one in Gerasene inscriptions there lies a long period. An ἀρχων occurs again in an inscription already referred to, belonging to the year 258 of our era.³ This ἀρχων appears at the head of a Synarchy of which the γραμματεὺς is the eponymous magistrate. Other mentions of ἀρχοντες are of so late a period as not to enter into the scope of this paper.⁴

καὶ Ξέρξου Χαιρέου γραμματέως βουλῆς καὶ δήμου As far as we can find, this is the only mention of the γραμματεὺς in Syrian inscriptions of the first century. We noticed above that in the middle of the third century this magistrate was eponymous in Jerash.

This is hardly the place to discuss the position of the γραμματεὺς in the Hellenistic cities of the Roman Empire, especially since the subject has already been clearly treated by H. Swoboda.⁵ Suffice it to recall that he held a very important position. As evidence we may point out what Cornelius Nepos wrote about him in the biography of Eumenes: "*Itaque eum habuit ad manum scribae loco, quod multo apud Graecos honorificentius est quam apud Romanos. Namque apud nos re vera, sicut sunt, mercenarii scribae existimantur; at apud illos e contrario nemo ad id officium admittitur nisi honesto loco, et fide et industria cognita, quod necesse est omnium consiliorum eum esse participem.*"⁶ He is therefore, so to speak, an indispensable member of a Synarchy, and his presence in these magisterial colleges is one of their characteristics.⁷

ἐκτίσθη τὸ τεῖχος It is extremely unfortunate that a lacuna occurs just at the word which describes the nature of the structure which was erected. All that we know for certain is that five or six letters must be supplied to fill the missing part, and that the name of the building ends in -ος. The following words may be suggested as being of approximately the appropriate length: [ὁ οἶκ]ος, [ὁ βωμ]ός, [ὁ πύργ]ος, or [τὸ τεῖχ]ος.

The first word would mean, of course, "temple." But the content of the inscription is not of the type of dedications or commemorations usual for sacred buildings. There are, besides, only three sanctuaries which could possibly come under consideration: the Zeus temple, the Artemis temple, and the so-called Dionysos temple. The building inscription of the first is known, and is dated 162 A.D.⁸ The other two temples are quite apparently of a date younger than our inscription. Ὁ βωμός is

¹ Chapot, *op. cit.*, p. 237.

² Aristotle, *Ἀθηναίων Πολιτεία*, 24, 3.

³ Lucas, *op. cit.*, no. 14.

⁴ *Ibid.*, nos. 22-24.

⁵ *Die Griechischen Volksbeschlüsse*, 1890, pp. 206-12.

⁶ Cornelius Nepos, *Vita Eum.* I, 5 (Text of Nipperdey).

⁷ Lévy, *op. cit.*, pp. 266-68.

⁸ Lucas, *op. cit.*, no. 18.

impossible. The prescript with the Pax Augusta and the whole tenor of our inscription would be quite out of place on an altar.

The other two suggestions remain, therefore, as the more likely. The reports of the excavations at Jerash in the spring of 1931 (not yet completely published)¹ describe the finding of the foundations of a tower at the northeast angle of the *temenos* of the Zeus temple, and also the discovery of an elliptical enclosing wall surrounding the forum and of an enclosing wall for the area of the Zeus temple on the north. Both of these walls and the tower were bonded together and seem to be of the same period. The exact nature of the tower is unknown. It is possible that our inscriptions were erected for the tower or for the two walls. We may suggest, however, that they would be more appropriate for the enclosing walls than for the tower. The latter would ordinarily require only one inscription placed over the entrance, whereas we may conjecture that an inscription would be placed on each of the enclosing walls of the temple, on the north and east, or perhaps one on the enclosing wall of the forum and the other on the wall of the temple *temenos*. Wherever they were placed, it seems to us most probable that the dedicatory inscriptions were prepared for this complex of enclosing walls and tower.

But if we accept the conjecture of τὸ τεῖχος, is it not possible that the wall which is mentioned was the fortification wall on the south, containing the South (or Philadelphia) Gate, near which the first inscription was found? One is tempted immediately to connect the building of this wall with the Jewish insurrection which was just breaking out in 66 A.D. But the mention of the Pax Augusta would be entirely unfitting in this connection, as we have already had occasion to observe. Furthermore, a careful study of the description of this insurrection by Josephus will show that there was little need for a fortification wall at just the time of the inscriptions under consideration.

As we have mentioned above, the Jewish revolt broke out at Jerusalem in August, 66. On the same day, according to Josephus, there was a massacre of Jews at Caesarea, and soon thereafter, the Jews rose up and sacked several cities, including Philadelphia, Gerasa, and others of the Decapolis.² This sack of Gerasa came shortly after the seventeenth of Elul of 66 (according to the conjecture of Thackeray), and therefore before the beginning of the 129th year of the Pompeian era, which would have been in September-October, 66 A.D. The Gerasenes cannot, therefore, have erected a fortification wall in the 129th year of the Pompeian era *before* the sack by the Jews; and there would be no purpose in erecting such a wall after the danger from the Jews had passed. Furthermore, we are compelled by a later statement of Josephus to conclude that the hostility between the Graeco-Romans at Gerasa and the Jews was not very strong, for, says Josephus, Γερασσηνοὶ τε οὔτε εἰς τοὺς ἐμμείναντας ἐπλημμέλησαν καὶ τοὺς ἐξελθεῖν ἐβελήσαντας προέπεμψαν μέχρι τῶν ὄρων.³ We can hardly suppose, therefore, that this fortification wall on the south was constructed by the people as a protection against the Jews.

But Josephus later relates that Vespasian sent a special detachment against Gerasa under Lucius Annius, who took the city by assault, gave his soldiers license

¹ But see Fisher, "Excavations at Jerash, 1931," *B.A.S.O.R.* 45, 1932, pp. 5-8.

² *Bellum Judaicum*, II, xviii, 458-59.

³ *Ibid.*, 480.

to plunder the property, set fire to the houses, and advanced against the surrounding villages.¹ This was in the summer of 68 A.D. We must conclude, however, either with Schürer² that this was not the Gerasa of the Decapolis, which was a Hellenistic city enjoying the favor of Rome; or that Josephus has falsified or considerably exaggerated the facts. There is absolutely no archaeological evidence to indicate such a plundering and destruction of the city; on the other hand, inscriptions³ and other finds show that the city suffered no great disruption of its normal life at this time. There is little likelihood that the Gerasenes found it necessary in 66–67 A.D. to erect a fortification wall against the Romans. Even if Annius did plunder the city as Josephus reports, it is most improbable that the people of Gerasa foresaw the danger a year or two in advance.

We see no reason, therefore, for connecting our inscriptions with the building of a fortification wall in relation to the Jewish revolt of 66–70 A.D.

ἐκ τῶν τῆς πόλεως. A very similar phraseology occurs in an inscription from the village Btheine in Batanaea: ἀνέγειραν τὸ τυχλὸν ἐκ τὸ [sic] τῆς κώ[μ]ης.⁴ (τὸ for τοῦ is obviously the mistake of the stonecutter.) With the material known at present it is impossible to trace the sources of revenue of the city treasury of Jerash, and there would hardly be space here to investigate this problem, even if useful material were at hand.

διὰ ἐπιμελητῶν Μελίτωνος Ἀπολλωνίδου τοῦ καὶ Νικάνορος καὶ Τιμάρχου τοῦ Λυσιμάχου. The formula of charging a person (or a group) with the execution of some work is usually expressed with the verb ἐπιμελεῖσθαι or with the noun ἐπιμελητής.⁵ Nicanor is frequently a Macedonian name, and Lysimachus is also popular among the Macedonians. The other names are Greek.

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¹ *Bellum Judaicum*, IV, ix, 487–90.

² *Op. cit.*, I, p. 620, note; II, p. 180.

³ There are inscriptions of the years 67–68 and 69–70 A.D., the former referring to a public building, the latter to a gift for the ἱερόδουλοι of Zeus and the Zeus Temple. See Jones, *J.R.S.* XX, 1930, p. 43, no. 61, and Lucas, *op. cit.*, no. 9. The history of Jerash is discussed more fully by Fink, *J.R.S.* XXIII, 1933, pp. 109–124. ⁴ Waddington, *op. cit.*, no. 2127. ⁵ Larfeld, *op. cit.*, II, pp. 827–29, 839, 841.

NOTE:—Since the preparation of this paper, M. Holleaux has published a Seleucid inscription of Syria which implies an interpretation of the ἄρχοντες at variance with the one suggested above (cf. *B.C.H.* LVII, 1933, pp. 6–67, esp. pp. 20–25). Without entering fully into the arguments of M. Holleaux, we suggest that our interpretation is the more natural for the above Gerasene inscription.

SOME UNPUBLISHED VASES IN THE UNIVERSITY
MUSEUM, PHILADELPHIA

PLATES XXXII-XXXVI

1. IN 1897, with the consent of the Italian Government, the University Museum acquired a group of vases from a chamber tomb in Vulci. Among them was a Corinthian amphora (M.S. 552), Pl. XXXII, which attracted the attention of Furtwängler in 1905,¹ was briefly described by Luce,² and has recently been listed (775A) by Payne in his *Necrocorinthia*.³

The shape, as Furtwängler first remarked, is rare, but it is not unparalleled. It corresponds to that of an amphora in Athens,⁴ except that it has a moulded ridge at the base of the neck, and that the profile of the rim is rounded. The illustrations will serve to supplement and somewhat alter Luce's description of the vase. The pictures in the two shoulder panels are not alike; the festal procession of the middle zone is scarcely adequately described as "human figures all marching to left"; the lowest frieze is not "the usual band of orientalizing animals," but a horse race. The neck, rim and the upper parts of the handles are covered with the same orange-brown color which is used for the figure decoration. Against this background are painted rosettes of white dots. Portions of the figures are overlaid with red but there is no white. Incised lines are abundant.

The painter of the horse race seems to have begun his work in the middle of the obverse with a compact little horse; as he worked to the right, he tired of his vain repetitions and drew his horses longer and longer, until the last was nearly twice the length of the first. The horsemen are represented with whips in either hand.

The procession of the middle zone starts on the reverse with a flutist in a long robe (Pl. XXXII B).⁵ A chorus of eight girls with joined hands follows. All but two carry garlands. Next comes a figure which discloses the purpose of the procession; it is that of a girl drawn shorter than the others to leave room for the ritual objects which she carried on her head (Fig. 1). The painting here is sadly defaced, but with the help of two other pictures by Corinthian artists of trays of offerings, the one on



FIG. 1.—PRIESTESS WITH SACRIFICIAL
BASKETS

¹ Sitz. Bay. Akad. 1905, p. 255; *Kl. Schr.* ii, p. 497.

² *Catalogue of the Mediterranean Section of the University Museum*, p. 56.

³ An alabastron from the same tomb is reproduced by Payne, *op. cit.* Pl. 20, 1 and 2.

⁴ Payne, *op. cit.* p. 300, fig. 137.

⁵ Cf. the flutist and dancing girls on an early Corinthian pyxis in Berlin, Payne, *op. cit.* pl. 23.

the pyxis in Paris (Fig. 2),¹ the other on a sherd found by Shear at Corinth,² it is possible to discern the outlines of the painting, and make out two trays of offerings, one above the other. The lower tray is held by rings riveted to its base, as in both the other pictures. It was perhaps made of bronze, and is unusually deep, its outer face ornamented with wavy lines comparable to the pairs of lines on the Paris pyxis. At either end of the tray are elaborate supports from which rise pairs of upright lines connected at the top. These lines correspond closely to similar lines on the Paris pyxis and probably represent high handles by which the tray could be lifted. In the center of the tray, as in the other two pictures cited, is a pyxis or basket for small offerings or sacrificial implements. What makes our scene unique,



FIG. 2.—DETAIL OF CORINTHIAN PYXIS, PARIS

however, is the fact that upon the pyxis or basket of the first tray rests a second similar but smaller tray with similar pairs of upright lines and a similar basket.³

The tray-bearer is followed by a chorus of seven girls wearing himations. They occupy the most important part of the frieze—the center of the obverse. They do not seem to be dancers, since their hands are not joined; perhaps matrons or priestesses.

Brinkmann in his useful article on *Altgriechische Maedchenreigen*⁴ divided festal dances into two classes, the *Gangreigen* and the *Standreigen*, corresponding to two types of songs, the *προσόδια* and the *στάσιμα*. The one was danced by girls as they marched in procession and was accompanied by the flute; the other, a *κυκλικὸς χορὸς* was danced at a sacred place in an *ὀρχήστρα*. This second dance, Brinkmann

¹ C. V. A., *Bib. Nat.*, Fasc. I, pl. 17.

² A.J.A., XXX, 1926, p. 448, fig. 3.

³ Representations of sacrificial baskets in later vase-paintings have offered considerable difficulties. I find it difficult to agree with Deubner (*Jb. Arch. I.*, XL, 1926, p. 213), that the problem of the central protuberance of baskets is solved by saying that it represents a third handle "mit Flechtwerk gefüllt." It may be worth noting that the hatched object in his Figure 4 is not unlike the pyxides on our trays.

⁴ *Bonn. Jahr.* 130, 1925, pp. 118-146.

finds, is more often depicted on vases, because better adapted to filling a zone of ornament. Which type of dance is represented on our vase? The girls with joined hands suggest the circular dance; the flutist, the girl with the sacrificial trays, and the women who are not dancing suggest the processional dance. The difficulty disappears if we hold that the artist did not observe the unities of time and place but



FIG. 3.—SHOULDER PICTURE ON OBERSE OF EARLY CORINTHIAN AMPHORA

merely painted on his pot the component parts of a festal celebration. The girls of the *choroi* he represented in their most characteristic attitude with joined hands.

In the shoulder panel on the obverse, Fig. 3, is painted a domestic scene.¹ On the left a bearded man is seated on a couch before which is set a table with food, and a stool. He extends his hand in welcome to a man who, to judge by his staff, is a traveller. Behind the seated man is a child and an attendant; behind the traveller is

¹ Cf. Payne, *op. cit.* p. 117.

another attendant and on the extreme right a seated woman spinning. One thinks of Nausikaa, Alkinoos, Odysseus, and Arete, but it is wiser to leave them nameless.

Pictures of women spinning are rare on Corinthian vases; one occurs on an alabastron in Berlin,¹ another on the Paris pyxis already cited, a third has been found recently at Perachora.²

In the shoulder panel of the reverse are six draped figures.

In view of the profusion of stop-gap ornaments on this amphora, some of them rectilinear, it may well be placed at the very end of the Early Corinthian period, ca. 600 B.C.

2. In the autumn of 1932 the Museum received on loan a collection of vases made by the late Hermann Hilprecht. Noteworthy among them is a panel amphora (L 2940)

Pl. XXXIII, on the obverse of which is painted the bust of a man, on the reverse, the protome of a horse. The vase is unbroken and the surface practically undamaged.

The shape merits consideration. It is more slender than Attic amphorae with comparable panels, such as that in Munich³ or that in Dresden⁴; the neck is higher; the handles merge less smoothly into the body of the vase; the outer face of the lip approaches more closely a perpendicular. All these features, as Payne has pointed out, are to be found on a Corinthian amphora in Heidelberg⁵ (Fig. 4), and are repeated on other Corinthian amphorae.⁶



FIG. 4.—AMPHORA IN HEIDELBURG

The reserved panel invades the area of the neck and is embellished above with a band of net pattern, in which rows of white and of black dots alternate. Below the net pattern are two bands of dilute black; above, a band of white; below the panel two bands of red and between them a reserved strip. Above the foot are two rows of rays set at different levels, but extending, all of them to the lower margin of the black zone about the body of the vase. Most of these features are to be found on the Corinthian amphorae cited. The clay of the slip on which the rays are painted is paler than that which serves as background for the panel pictures. A reserved line below the rays seems to show no slip. Three reddish lines decorate the foot; three the neck; and three the lip, one along the inner edge of the top surface, the other two along the upper and lower edges of the outer surface.

In the picture of the obverse panel, Pl. XXXIII A, the face and neck of the man are colored red, his hair, beard, eye, ear, and garment left black. White is used for the double fillet, crossed above the ear, and for the broader band that confines the hair

¹ Van Hoorn, *De vita atque cultu puerorum*, pp. 32-33, figs. 11 and 12; Payne, *op. cit.* no. 1205; Pfuhl, *Mal. und Zeichn.*, Abb. 172.

² *Illustrated London News*, May 2, 1932, p. 749.

³ *Jb. Arch.* I, 1909, p. 83.

⁴ *Id.*, 1914, p. 221, Fig. 15.

⁵ Payne, *op. cit.*, pl. 35, 3, and p. 316, no. 1154, and footnote 2.

⁶ See e.g., Tillyard, *The Hope Vases*, pl. 7, and C.F.A., *Copenhagen* 2, IIIc, pl. 92, 1.

at the nape of the neck. Incised lines are used for details and were apparently made before the red color was applied, for the red in several places¹ seems to follow the incisions rather than the contours of the black areas. For the inner contours of beard and hair crinkly lines are used. The nose is long and thin, the lips excessively thick, the central cartilage of the ear large.

In the reverse picture, B, red is used for the horse's neck, black for the head, shoulder, and hoofs. The locks of the mane are red and black alternately. Their outlines are represented as usual on Corinthian vases by crinkly lines. Protomes of horses with both hoofs represented, appear several times on Middle Corinthian plates.² These plates belong to the Chimaera group, dated by Payne, on the evidence of Attic parallels, to the years 580-570 B.C., and to the same period belongs the Copenhagen plate with sphinxes, the features of which are comparable to those of the man on our vase. It is perhaps safe, therefore, to assign our vase to the same decade.

3. A second vase (M.S. 714) to attract the attention of Furtwängler³ in 1897 is the olpe of figs. 5 and 6. It was acquired with the Early Corinthian amphora at Vulci but is one of a miscellaneous group, the exact finding place of which is unknown. It is complete except for a small portion at the juncture of neck and handle where probably disks are broken away. A ridge separates neck and body. The surface is covered with an orange-brown wash paint except in the lowest zone where the slipped surface serves as background for a pattern of rays. On either side of the handle are three dot rosettes painted in a creamy white color, one on the neck, two on the shoulder. The remaining space on the shoulder is filled with a tongue pattern; reddish-purple color here alternates with the reddish brown of the slip except at one point where two tongues of the color of the slip occur side by side, presumably by mistake. Below the central zone are numerous bands of white and purplish red.

The decoration of the central zone is applied below the handle and encircles the vase. Hoplites are marching and no two march alike. One extends a foot far in advance, another is balanced on the ball of his forward foot with shoulders well forward, another lounges along. Helmets and greaves are cursorily rendered, the latter merely by knobs below the knees. Again colors alternate. One hoplite has a red helmet with white shield and white legs, the next a white helmet with red legs



FIG. 5.—ETRUSCAN IMITATION OF A LATE CORINTHIAN OLPE. HT. .25 M

¹ Notably the lips. Cf. the features of the sphinxes in *C.V.A., Copenhagen 2, IIIc, pl. 90 A.*

² Payne, *op. cit.*, p. 313, 1047 (Buschor, *Griech. Vas.*, p. 94, fig. 68), 1048, and 1052.

³ *Op. cit.*, p. 256.

and red shield. The artist must have begun his work opposite the handle and worked to the left, and when he reached his starting point he found that his colors were coming out wrong. His first man had a red helmet, with white legs and shield, and his next to last the opposite scheme. What could be done with the intervening figure? A partial solution was found by giving the intervening man one red leg and one white, and by painting half of his shield white and half red. Two red helmets, however, were left side by side. The incised outlines for these figures are filled with white.

The artist's race is betrayed by his penchant for alternating colors, the humor with which he portrays the various gaits of marching hoplites, the very proportions of his short lively figures, the good cheer which prevails in the scene. For the use of

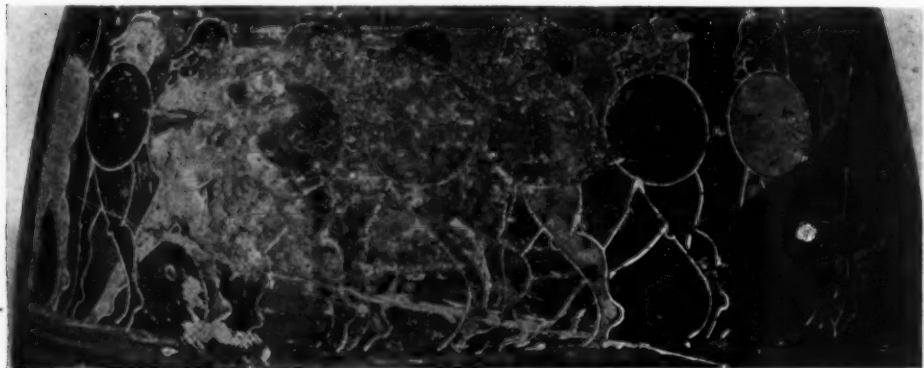


FIG. 6.—ETRUSCAN OLPE. DETAIL

alternating colors may be cited the Caeretan hydria in the British Museum¹ (Fig. 7), or the Busiris hydria in Vienna.² Nor is the lively and humorous style of these paintings on Caeretan hydriae unlike that of the frieze of the Philadelphia olpe.³ Our vase is, therefore, Etrusco-Corinthian and its lively, colorful style may be traced ultimately beyond Etruria to the coast of Asia Minor. That it reflects the late period of Corinthian painting, dated by Payne to the second quarter of the sixth century, is shown by the use of red ground for the figures.

4. In his *Ornamente*, Jacobsthal described⁴ a type of olpe, generally with trefoil mouth, the painted panel of which extends from the handle across that portion of the vase opposite to the handle. In his *Necrocorinthia*, Payne listed ten Late Corin-

¹ Walters, *Cat.*, II, pl. II. I am indebted to Dr. Valentin Mueller for calling my attention to this parallel.

² Pfuhl, *Malerei und Zeichnung der Griechen*, figs. 152 and 153, and p. 179. This fondness for alternating colors characterizes also the wall paintings of Etruscan tombs. As early as the Tomba Campana (Swindler, *Ancient Painting*, fig. 389), one foreleg of a horse is light, another dark; and for a later period see the paintings of the Tomba della caccia e pesca and the Tomba delle iscrizioni (F. Weege, *Etruskische Malerei*, Beilage III, 3 and 4). Cf. also the shields on the Etruscan hydria in Toronto, Robinson, Harcum and Iliffe, *Greek Vases in Toronto*, pl. IX, 126.

³ Ducati has recently called attention (*Pontische Vasen*, p. 9) to the humor of the drawing on the so-called Pontic vases, especially to earlier examples which stand close to Klazomenian art.

⁴ P. 16.

thian olpai of this type¹ and also the Attic imitations of the type.² The latter list was supplemented by Beazley and Payne in their publication of *Attic Black-figured Fragments from Naukratis*.³

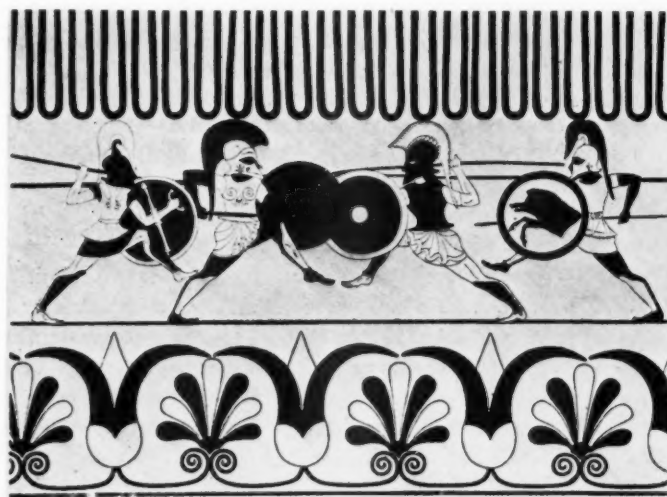


FIG. 7.—CAERETAN HYDRIA, LONDON. BRITISH MUSEUM

In the storage room of the University Museum there came to light in 1932 an olpe of this shape (Pl. XXXIV, A, B). Nothing is known of its provenance. It is not well preserved; the clay of which the vase is made is soft and is badly broken about the mouth. The entire surface of the vase, moreover, has suffered sadly from overcleaning, in the process of which there has been largely removed not only the black paint which had covered all but the decorated panel, but also the outer surface of the reserved background for the figures of the panel, which, in firing, had taken on a pinkish color. Only a few small patches of pink which escaped the notice of the cleaner now remain; elsewhere the chalky white of the interior of the wall of clay is exposed, giving the erroneous impression of a white slip.

Above the panel on the neck of the vase is a pattern of broken maeander and above this a row of tongue pattern. These patterns correspond closely to those on two Corinthian olpai in the Louvre,⁴ one of which is shown in Fig. 8, except that in the tongue pattern on our vase there are no traces of any other color than black.

In the panel picture is represented a running spearman between two sphinxes. These figures also have suffered from overcleaning; the sphinxes were not originally



FIG. 8.—CORINTHIAN OLPE. PARIS, LOUVRE

¹ P. 326.

² Pp. 191 and 193.

³ *J.H.S.* 1929, pp. 253 and 254.

⁴ Pottier, *Vases Antiques du Louvre*, pl. 51, 647, and 648.

as wasp-waisted as at present, as may be seen from the course of the incised line which once outlined the body of the sphinx on the right; similarly the right hand and fore-arm of the spearman were once much broader. The ears of the sphinxes are drawn according to the same scheme as those of the man on Pl. XXXIII, A.

The question which arises in connection with this vase is whether it should be added to Payne's list of Corinthian vases or to Beazley's and Payne's list of contemporary Attic vases. The drawing looks Corinthian¹ and the decorative patterns are, as we have seen, characteristic of those found on Corinthian vases of this shape, so that the vase should be added to Payne's list of Late Corinthian olpai assigned to a period shortly before the middle of the 6th century.

5. Among the antiquities purchased by Frothingham in 1897 with the consent of the Italian government was a mass of vase-fragments from Orvieto from which many of the vases in the University Museum have been constituted. The pieces of the mastos (M.S. 4869), Pl. XXXIV, C, were sorted out years ago but not until 1931 was a piece found which connected the fragments from the rim with those from the lower part of the vase. Both handles are missing but their position can be determined on the evidence of a few pieces which show smooth edges where the handles were inserted and curved brush lines in the black glaze where it was applied around the handles. Both handles were horizontal.

The cup is exquisitely light and its decorative patterns fine and delicately applied. Ivy leaves painted on a white ground decorate the rim and in the area about the nipple are: a dotted pattern, ivy leaves, dark on a clay ground, tongue pattern in which red and black alternate, more dotted patterns and fine lines.

This succession of patterns recalls the Siana cups in the British Museum² and suggests the third quarter of the sixth century as the date to which the cup should be assigned. And, as a matter of fact, to this same period belong most, if not all, of the Attic mastoi. Two Corinthian mastoi are earlier; one in the Louvre³ being assigned by Payne to the Middle Corinthian period and belonging, therefore, to a period before 575 B.C.; the other in Athens,⁴ listed by Payne with the Middle Corinthian Vases, although the possibility is admitted that it may belong in the succeeding period. The two earliest Attic mastoi, according to Payne, are British Museum 375⁵ and the unpublished British Museum 377, which he assigns to 550-540 B.C. To the succeeding years must belong the other mastoi which, so far as I know them, are:

British Museum 376: eyes on obverse and reverse and satyrs under the handles. Unpublished.

British Museum 681. Jacobsthal *Ornamente*, Pl. 32.

Cervetri: black glaze, patterns like those on our vase but fewer. Recently excavated and unpublished. I owe my information about this vase to the kindness of Mr. Beazley.

Munich 2003, Jacobsthal, *op. cit.* Pl. 33. The ivy pattern, the dots connected with lines and the shape of the nipple correspond closely to those on our vase.

Cracow, 1076: Satyrs and Maenads. Beazley, *Greek Vases in Poland*, p. 4.

¹ Cf. e.g., the drawing of a warrior on a Corinthian crater in the Louvre. Pottier, *op. cit.* pl. 45, 627.

² C.F.A. *Brit. Mus.* II, III H e, pl. 8; cf. Beazley, *Vases in Poland*, p. 4.

³ Payne, *op. cit.* pl. 33, 2, and Daremberg and Saglio, *Dict.* III, 2, fig. 4856.

⁴ Weicker, *Der Seelenvogel*, p. 14, fig. 8; Payne, *op. cit.*, no. 1000.

⁵ N. Y. *Shapes*, pl. 22.

Brussels, 297, unpublished.

Paris, Bib. Nat. 352, *C.V.A. Bib. Nat.*, II, III, pl. 68, 7, 8, and 9.

Würzburg, *Mon. ined.* 1, 2, pl. XXVIII, no. 49; Gerhard, *Aus. Vas.* Pl. 56, 1.

Baltimore, Walters Collection. This beautiful vase, doubtless the finest mastos in existence has recently been put on exhibition. In the main zone of decoration is painted a battle of hoplites. One handle is horizontal, the other vertical.

6. A cup from the Henry C. Lea collection¹ was presented to the Museum in 1921 by Miss Nina Lea (Pl. XXXV). It is sadly damaged; the foot and several fragments are missing and the surface is so defaced that most of the inner markings have disappeared. The inner picture has suffered most, Pl. XXXV, A. A Maenad, thyrsos in one hand, jug in the other, is running to a revel, probably that depicted in the outer pictures of the cup. Her himation is stiffly extended behind her; the folds of her billowing chiton are represented by groups of lines, a few of which are preserved, and others of which can be traced only by the grooves of the preliminary sketch.

On face A of the exterior a maenad and silen are dancing boisterously. She seems to have pushed him back and he to be momentarily retreating. A second silen marks the time by clapping his hands, his lips parted from his exertion and from the excitement of the dance. A third silen on the right moves away a little to give them room, but joins too in the movements of the dance. The face of this silen is better preserved than those of the others. He has a small pug nose, high pointed goat's ears and a long beard. A red fillet adorned with leaves above and below is drawn about his bald forehead. On face B of the exterior is a similar scene but differently composed. This time the silen is advancing, his big head thrown back, his arms extended toward the Maenad who feigns a retreat. Again there are two silens at the right, their arms, legs and heads skillfully disposed to make a compact and symmetrical group.

And the artist who painted these pictures? The big head of the silen on the left of Pl. XXXV, C recalls the silen on the Boston cup by the Panaitios painter,² but the hand is not the same. Moreover the Panaitios painter would never have drawn a himation as that worn by the Maenad on the interior picture is drawn. Mr. Beazley has very kindly written me his solution of the problem: "the cup seems to be an unusually careful work by the painter of Berlin 2268."

7. Last year it was discovered that the stem and interior picture of a cup which, in some stage of the long process of sorting and joining the vase-fragments from Orvieto, had been made into a separate item, was the missing central portion of the cup published by Luce.³ The cup, as it now appears is shown in Pl. XXXVI. One handle and several pieces are still missing.

The pictures represent domestic scenes. On the interior, Pl. XXXVI, A, a woman stands between a wool basket and a chest, a lekythos in one hand, a box in the other. On face A of the exterior, Pl. XXXVI, B, a seated woman receives a visitor; from behind her approaches an attendant or a sister,⁴ with a mirror. On the wall hang sashes, a lekythos, and a sakkos.

¹ Cf. *The Museum Journal*, Vol. XXIII, no. 1; "Recent Additions to the Classical Collections."

² Beazley, *Att. Vas.*, p. 167, no. 21.

³ *The Museum Journal* 1921, Vol. XI, p. 64, fig. 41.

⁴ Beazley, *C.V.A. Ashmolean*, I, p. 31.

On face B, Pl. XXXVI, C, a woman just arisen from a chair, in front of which is placed a wool basket, stands, mirror in hand, between two helpers, one of whom extends an alabastron, and the other hastens forward with a casket. A sash and sakkos hang on the wall.

The painter of this vase is easily identified; the first impression of these over alert faces with their wide-opened eyes, drawn correctly in profile, and their prominent underlips, suggests the Sabouroff Painter, and this impression is confirmed by a comparison of feet and drapery with those of the neck figures and figures in the lowest register of the loutrophoros in the University Museum.¹ Mr. Beazley has kindly confirmed this attribution.

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¹ See Beazley, "Battle Loutrophoros," *The Museum Journal*, XXIII, 1932, pp. 5-22.

CONCERNING THE CURVATURE OF THE STEPS OF THE PARTHENON¹

PLATE XXXVII

If the visitor to the Acropolis at Athens stands at an angle of the Parthenon and sights along the steps, he will note that they are not perfectly horizontal, but that on all sides of the temple they curve upward in the middle—crowned, in technical parlance (Fig. 1). The curvature is so slight, however, that it is hardly to be remarked from any other position. Francis C. Penrose, in 1851, was the first to publish carefully these particular curves,² although they had been noted before his day. His researches demonstrated conclusively that the curvature is not due to a settlement of the foundations, for the regularity of the curves on all four sides of the temple excludes such a possibility. Consequently he argued correctly that Ictinus, the architect of the temple, deliberately crowned the steps.³

In 480 B.C. the Persians under Mardonius sacked the Acropolis. They found an unfinished Parthenon, which they promptly attempted to destroy. Its foundations of poros and some other of its elements, however, escaped destruction.⁴ When the Greeks regained possession of Athens and started to erect the Parthenon of the Periclean Age, they utilized the foundations of the earlier half-completed temple. If we examine the foundation courses of this earlier temple, we find that they, too, are crowned, which shows that before the Persian invasion of 480 B.C. Athenian architects were familiar with long subtle curves.



FIG. 1.—CURVATURE OF THE STEPS OF THE
EAST FAÇADE

¹ The author is grateful to Prof. Bert H. Hill for valuable criticism in the preparation of this article.

² F. C. Penrose, *The Principles of Athenian Architecture*, London, 1851.

³ The courses of the wall behind the columns and the members of the marble entablature above the columns are also intentionally crowned; and the same is true of the steps upon which the columns of the pronaos and the opisthodomos rest. Penrose's studies established the fact that the ancient Greeks employed regular curves of one kind or another in all the monuments he investigated. He sometimes found such curves in raking cornices, entases of columns, mouldings, and soffits of cornices, in addition to those places already mentioned. Penrose does not note that the vertical joints of the steps of the Parthenon are practically normal to the curves and thus not rigidly vertical.

⁴ B. H. Hill, "The Older Parthenon," *A.J.A.* 1912, pp. 535-558.

Let us confine our attention for a moment to the curvature of the top step—the stylobate—of the Parthenon. The surface upon which the columns rest occupies a position of capital importance in so far as the design of the temple is concerned, for here important horizontal elements of design (the steps) change into important vertical elements (the columns). The surface in question—the surface upon which the columns rest—is determined by the line of intersection of that surface with the vertical face of the top step. The architect of the temple would surely have given particularly careful study to this line. The following data concerning, some directly and others indirectly, this line of intersection are taken from Penrose's publication:

- i. The lines of intersection of all four façades curve upward in their middle;
- ii. The rise of the east curve is approximately equal to the rise of the west curve (an average rise of 0.225' in an average distance of 101.351' across the top of the top step);¹
- iii. The rise of the north curve is approximately equal to that of the south curve, and is about double the rise of the curves on the east and west, due to the fact that the temple is roughly twice as long as it is wide;
- iv. All four curves closely approximate parabolas with vertical axes almost exactly at the middle of the steps;
- v. The heights of the three steps are everywhere practically the same;
- vi. The curvatures of the foundations of the earlier Parthenon are considerably less than the curvatures of the Periclean Parthenon. The top surface of the foundations of the earlier Parthenon had to be "shaved down" toward certain angles of the temple to accommodate the steps of the Periclean Parthenon. In other words, the curvatures of the Periclean Parthenon were designed and executed independently of the curvatures of the earlier temple;
- vii. The four angles of the temple, taken on the top of the stylobate, are not in the same horizontal plane, the southwest angle being 0.157' (almost 2") higher than the northeast angle; this is the greatest variation from the true level;
- viii. The surface upon which the columns rest pitches gently outward to throw rain water away from the temple. The pitches vary slightly on the four sides, the average rate of pitch being 0.8 per cent. The surface also pitches to follow the curve of the stylobate.

Penrose does not indicate clearly how Ictinus might have determined and laid out the curves of the steps. There are, however, two passages in Vitruvius which will help us to understand how Ictinus might have accomplished this easily and quickly. The following is a translation by M. H. Morgan² of the first passage (Vitr. III, iv, 5):

"The level of the stylobate must be increased along the middle by the *scamilli impares*; for, if it is laid perfectly level, it will look to the eye as though it were hollowed a little. At the end of the book a figure will be found, with a description, showing how the *scamilli* may be made to fit this purpose."

Unfortunately the "figure and description" at the end of the book have not come down to us; we are, therefore, left to work these out for ourselves—if we can. The second passage in Vitruvius (V, ix, 4), which merely refers to the first passage, at least emphasizes the fact that the usual practice in the time of Vitruvius—the last quarter of the first century B.C.—was to crown stylobates.

Authorities have explained *scamilli impares* in a great variety of ways.³ *Scamillus*

¹ Penrose's system of expressing distances in feet and decimals of feet will be adhered to in this article.

² *Vitruvius*, translated by M. H. Morgan, 1914, p. 89.

³ In 1914 Prof. H. L. Warren published a partial list of about twenty authorities (*Vitruvius*, M. H.

is the diminutive of *scamnum* which means a "bench," "seat," "step." *Scamnum* comes from the Greek word *σκάμνον* which, in its turn, means "bench" or "seat." But why is *impares* coupled with *scamilli*? *Impares* signifies "uneven," "unequal," "dissimilar;" it is also used of "odd (not even)" numbers. Now, as already stated, Penrose linked the parabola with the curve of the stylobate of the Parthenon. Perhaps a study of the parabola will help to explain the *scamilli impares*.

From definition, a parabola is the path of a moving point which is always equally distant from a fixed straight line (called the directrix) and from a fixed point (called the focus).

Let *A* (Fig. 2) be any point on the curve, and let *2a* equal the distance from the focus to the directrix. The origin, *O*, as it lies on the parabola, from the definition of this curve, is equally distant from the directrix and the focus. Also

$AB = AC$ from the definition of a parabola

or $x + a = \sqrt{(x-a)^2 + y^2}$, as $AB = x + a$ and $AC = \sqrt{(x-a)^2 + y^2}$

$$x^2 + 2ax + a^2 = x^2 - 2ax + a^2 + y^2$$

$$4ax = y^2$$

$x = \frac{1}{4a}y^2 = cy^2$, where *c* is a constant (as *a* is a constant, $\frac{1}{4a}$ is also a constant).

$x = cy^2$ is, then, the general equation of a parabola.

When	$y = 0$	$x = 0$
"	$y = 1$	$x = c \times 1$
"	$y = 2$	$x = c \times 4$
"	$y = 3$	$x = c \times 9$
"	$y = 4$	$x = c \times 16$
	etc.	etc.

Take the special case of $c = 1$. The equation of the parabola becomes $x = y^2$

When	$y = 0$	$x = 0$
"	$y = 1$	$x = 1$
"	$y = 2$	$x = 4$
"	$y = 3$	$x = 9$
"	$y = 4$	$x = 16$
	etc.	etc.

Graphically this particular parabola may be plotted as shown in Fig. 3.

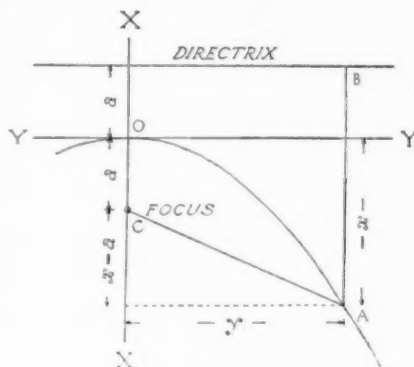


FIG. 2

Morgan, 1914, p. 320), and he indicated where the names of still other authorities could be found. He mentions Aug. Choisy last of all. Choisy published in 1909 the explanation of the *scamilli impares* set forth in the present article (*Vitr.*, A. Choisy, 1909, Vol. I, p. 146; Vol. IV, pl. 34, fig. 1), submitting no proofs, however, and crediting A. Aurès with the interpretation. But Choisy gave no reference to any

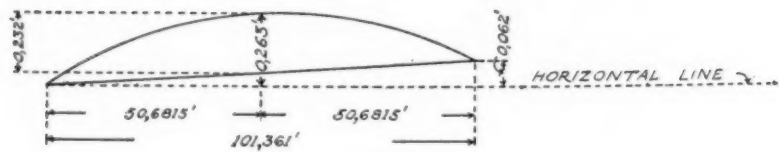


FIG. 5

Let us see if points on the curve a distance apart about equal to the axial distance of the columns will determine the curve sufficiently accurately. This arrangement brings a point between each column, though not exactly half way between the columns; and it divides the long straight line between the extremities of the curve into eight equal parts, a division which can readily be made. If it be found that the curve is not sufficiently accurate, a greater¹ number of points upon it may be determined. Now, the architect, in his working drawing, does not have to draw the horizontal distances at full size; he may use any convenient scale, as indicated in Fig. 6 (in this particular case 1 cm. = 10 feet). Here we see that a point between each column determines the curve sufficiently accurately for our purposes. Observe that all vertical coördinates are at true size. In Fig. 6 locate on *AB* the centers of the bases of the

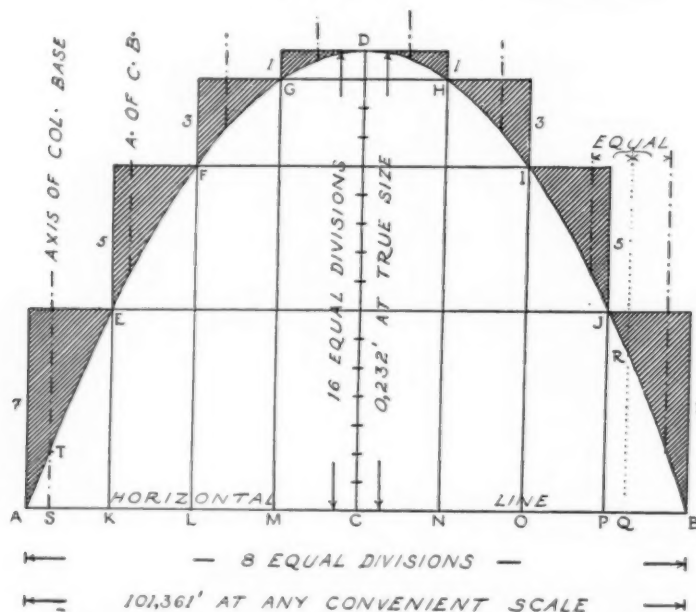


FIG. 6.—ARCHITECT'S THEORETICAL CURVE FOR WEST STYLOBATE

¹ Penrose himself says that he was not able to measure as many points on the curve as he would have liked, on account of the weathering and wearing of the top step. Furthermore, no theoretical curve can be reproduced in stone with absolute mathematical precision. In architectural practice of today the difference between the measurements in Fig. 5 and those given by Penrose would be considered negligible.

6), $L'F' = LF$, etc. The resulting curve $AD'B'$ (Fig. 7) will be a parabola; this is graphically demonstrated in Fig. 8¹ (the mathematical proof is not difficult).

At last, we are in a position to understand how the architect of the Parthenon might have easily laid out his curve at full size upon the vertical face of the top step (the same principles apply to the curve of any of the steps, and even to the curve upon which the bottom step rests—see p. 537):

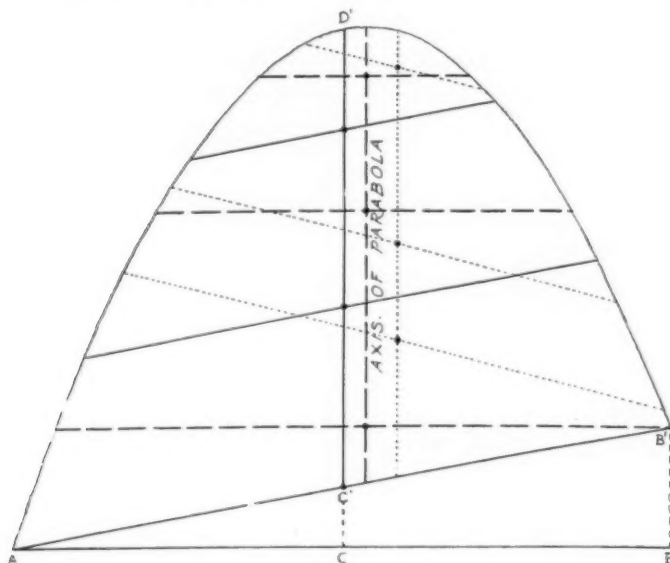


FIG. 8

- i. He determined on his working drawings of the temple the amount of crowning he desired to give both to the front steps and to the side steps; an experienced Greek architect would know this amount;
- ii. He made a working drawing like that of Fig. 6 for the front steps and a working drawing like that of Pl. XXXVII for the side steps.² (In Pl. XXXVII the horizontal distances are drawn at the scale of 1 cm. = 10 feet, so that Pl. XXXVII may be readily compared with Fig. 6);
- iii. At the four angles of the top step he marked the levels he desired for the extremities of the curve;
- iv. On the vertical faces of the top step he drew straight lines connecting the extremities of the intended curves;

¹ The theorem upon which the demonstration depends is as follows: If the loci of the center points of all systems of parallel chords of a curve are parallel straight lines, the curve is a parabola, and its axis is parallel to the direction of the loci.

² It will be seen, that, in Fig. 6 and Pl. XXXVII, points on the curve in front of the bases of the northwest angle column are not exactly at the same height (ST vs. SU) above the lines joining the extremities of the curves, and it can be shown by a simple calculation, that T and U are not exactly the same distance above A , the northwest angle of the stylobate, even if the inclination of the lines joining the extremities of the curves be taken into consideration. The difference is an insignificant amount, ca. $\frac{1}{16}$ ", and would cause little difficulty in so far as the bed is concerned upon which the angle column rests. A gentle warping of the top of the stylobate between the front of the column and the vertical face of the step appears to have taken care of the small difference, the edges of both stylobates remaining true parabolas, however.

- v. On the straight line joining the extremities of an intended curve he located
 - (a) the axes of the bases of the columns;
 - (b) points half way between the bases of the columns;
 - (c) any other points he might deem useful—the lower diameters of the columns, for example;
- vi. Through the points thus located he erected vertical lines, the heights of which he made equal to the corresponding heights on his small scale drawings of the curve. The tops of these vertical lines lay on the desired curve;
- vii. In the cases of courses of which only the top could be reached easily, a string (or wire) might be tightly stretched above the course, the string (or wire) corresponding to a line in a similar position on the working drawing. Measurements downward from the string (or wire) would locate the curve to which the top of the course was to be cut.

Note that in the above method the extremities of the curves may, or may not, be in the same horizontal plane. Also note the ease with which the curve is determined in the architect's drawing and actually laid out upon the vertical face of the step; in fact, this ease was probably the deciding factor in the selection of a curve determined by *scamilli impares* rather than some other curve.

How did the stone cutters proceed after the curve was marked upon the vertical face of the top step? It is difficult to answer this question from an examination of the top step today, as the Parthenon was a particularly well finished building, especially in places which readily caught the eye. The nearby Propylaea, of approximately the same date (about ten years later), is, however, of assistance in attempting to answer the question, as many of its surfaces still remain unfinished and consequently reveal not a few of the constructional features employed in Athens during the fifth century B.C. Here we see the drafted edges and countersunk bands and planes which give the intended final surfaces, and the scratches in the marble by which the axes of the columns were located, the circular scratches by which bottom drums were set, etc. Surely it is not difficult to believe that many of the building methods of the Parthenon were similar to those of the Propylaea.¹ The stone cutters of the Parthenon, then, probably proceeded as follows: after the curve was marked upon the vertical face of the top step, the top surface of the stylobate was cut away (not forgetting that the surface was to have a certain pitch), leaving, however, about 0.04' ($\frac{1}{2}$ "') of marble above the curve (this extra $\frac{1}{2}$ "' was to protect the surface during building operations and was removed only when the final dressing was given to the building as a whole). The next operation was to countersink in the provisional top surface of the stylobate the surfaces upon which the columns were to rest and to locate by scratches in these countersunk surfaces the positions of the columns themselves.² Final word

¹ Constructional scratches in the Parthenon similar to those in the Propylaea may be seen in the following places: scratches running east and west to locate the north and south columns of the pronaos (both scratches are on the east side); a circular scratch under a column of the pronaos, namely, the third column from the south; scratches in the stylobates of the pronaos and opisthodomos to locate the stone course which carried the grill between the columns. There are, also, many similarities in the methods employed for hoisting, dowelling, and cramping.

² A column of the south façade, the third from the southeast angle, throws a little light upon the countersunk surfaces beneath the columns. The western portion of the bottom of the column is broken away, revealing the fact that the surface upon which the broken piece rested is 0.01' ($\frac{1}{8}$ "') lower than the plane of the stylobate immediately to the west of it. This is an indication that the beds for the columns were prepared before the plane of the stylobate was given its final dressing. The architect's intention was to place the plane of the beds in the plane of the top of the stylobate—he did not quite succeed in this case.

as to the precise building operations must be left, however, to Mr. Nicolas Balanos, the Greek architect, who for more than thirty years has been at work consolidating and reconstructing (where possible) the Erechtheum, Propylaea, and Parthenon. In his forthcoming book entitled "L'Anastylose des Monuments de l'Acropole" he will give to the scientific world an immense amount of valuable information.

Objection will possibly be raised that Vitruvius, who practised four hundred years after the Parthenon was built, may not have been familiar with Ictinus' method of laying out the curve of a stylobate. Vitruvius mentions numerous Greek treatises on architecture, including a description of the Parthenon by Ictinus and Carpion (Vitr. VII, praef. 12). It is possible that Vitruvius never actually saw the treatise on the Parthenon, and that, further, if he did see it, there was no reference in it to the *scamilli impares*. There may even have been no reference to the *scamilli impares* in any of the treatises with which he was familiar. Even if this is so, we must still take oral tradition into consideration, which is often stronger than we suspect. The modern Greek word for "stool (a little seat)" is *σκαμνί*. If this word has survived for twenty centuries in a country almost continually in a state of turmoil, is it not possible to believe that there may have been a tradition of only four hundred years back of the *scamilli impares* of Vitruvius?

Finally, we may ask our most important question. Why did Ictinus crown the stylobate of the Parthenon? Vitruvius' answer to this is undoubtedly correct. In the passage already quoted he says: "if it (the stylobate) is laid perfectly level, it will look to the eye as though it were hollowed a little." Imagine, for a moment, that the north steps of the Parthenon, which can conveniently be observed from the Erechtheum, be constructed perfectly level, and that this long horizontal element of design be then loaded with the weight of seventeen heavy marble columns carrying not only an extremely heavy marble cornice but also half the marble ceiling back of the cornice. The seventeen loads upon the stylobate must be resisted not only in a manner which respects the crushing strength of marble, but also in a manner satisfactory to the eye; in other words, the steps should not seem to be too weak for their loading and as a result to appear "hollow," as Vitruvius says—that is, to sag. The crushing strength can be calculated by engineers; but there are only two ways to counteract the objectionable aesthetic effect: (1) by increasing the height of the steps; (2) by curving the steps upward in the middle, in a direction opposed to the downward loading of the columns. The first method—increasing the height of the steps—would throw the steps out of scale with the temple as a whole. Consequently the second method was preferred—the crowning however being only just sufficient to overcome the sagging effect. It was just this sort of refinement which gave ancient Greek architecture its extraordinary life and vigor.¹

ATHENS, GREECE
1934

GORHAM PHILLIPS STEVENS

¹ It is hoped that the present article, although primarily of interest to archaeologists, may prove of value to architects. The latter will find that the principles in the article can be made to apply both to stylobates and to broad flights of steps which do not support colonnades (such as that in front of the fore-court of Columbia University in New York City, and that in front of the War College in Washington, D. C., where, in both cases, the architects, McKim, Mead and White, intentionally crowned the steps).

THE DIOSCURI ON AN EARLY PROTCORINTHIAN ARYBALLOS

A PROTCORINTHIAN vase discovered at Thebes in 1896 and now in the Ashmolean Museum has been cited as giving a notable illustration of the earliest type of Greek cult statue (Fig. 1).¹ There are obvious Geometric reminiscences in the style of the painting which justify a date early in the seventh century. The scene of the principal frieze consists of seven figures, two of which are sphinxes serving probably purely decorative function. The other figures are two horsemen and two women while the fifth represents a warrior goddess. The first female figure counting from the left is clad in a garment reaching to the knees. She stands immediately behind the goddess whose arm she seems to touch. The raised position of her arms has suggested the interpretation that she is worshipping the goddess, but her place behind



FIG. 1.—FRIEZE ON AN EARLY PROTCORINTHIAN VASE

the deity favors rather the theory that she has sought refuge beneath the deity's spear. This goddess is dressed in a checkered peplos and is ready for action as her upraised spear and shield show. Between the goddess and the horseman on the right is a third figure which seems with one hand to touch the tail of the horse before her, and to hold in her upraised right hand not a pomegranate, as Casson suggests, but a garland. She faces the horseman on the right. Johansen's theory that this figure and the armed goddess are xoana of Aphrodite and Athena is favorably regarded by Casson (*ibid.*, p. 61). His statement that this is the only convincing vase-painting of a primitive Greek statue shows the importance of the scene, and the necessity for a consistent interpretation of the group as a whole.

Since the vase is a Corinthian product it is reasonable to inquire whether archaic Corinthian art offers any clue to the subject. The description of the chest of Cypselus by Pausanias (V, 19, 3), a Corinthian dedication at Olympia, mentions a scene of the DioscURI with Helen between them. The inscription reads: "the two sons of Tyndareus are carrying Helen away and dragging Aethra from Athens." Pausanias adds that Aethra is cast on the ground under the feet of Helen. The story is elsewhere known

¹ Casson, *The Technique of Early Greek Sculpture*, p. 60.

that Theseus had taken Helen from Sparta and that her brothers, the Dioscuri, captured Athens and rescued their sister, taking the mother of Theseus with them to become the slave of Helen. This is in general the theme of the Protocorinthian vase-painter which was also told by Alcman, the Lydian poet of the second half of the seventh century, in his song about the Dioscuri.¹ Since Alcman had settled in Sparta long enough to be called a Laconian, he may be assumed to have had complete knowledge of the traditions relating to the Spartan heroes and their sister Helen. In the vase-painting the figures of the twin horsemen are recognized at once. They



FIG. 2.—ATHENA PARTHENOS

are at Athens as is made clear by the statue of the Athena Parthenos. The identification of this cult-image is certain the moment it is compared with the earliest representation of that goddess which is found upon Panathenaic vases (Fig. 2). Her circular shield is that of the Protocorinthian goddess, and her spear likewise is brandished in the same position. It was altogether natural that the Panathenaic vases should represent the traditional Athena of the Acropolis, the one who is seen rising in armor from the head of Zeus or standing, immediately after her miraculous birth, upon his lap or before him—the same subject which Phidias chose for the eastern gable of the temple of the goddess.

The figure of Helen is next easily recognized in the fully draped form before the goddess. She wears a high polos as she does in Spartan art.² The examples are of the second century B.C. but an obvious archaism shows that an older type is preserved (Fig. 3). The type of Helen standing, fully draped and with polos, between her twin brothers is known also in western Pisidia and Milyas where there were Spartan colonies.³ The rock-cut relief of Alifaradin is an example (Fig. 4) which adds a figure of Nike.⁴ The idea of victory is conveyed in the Protocorinthian vase-painting by the wreath which Helen holds in her upraised hand. This motif is illustrated also by a geometric vase-painting likewise found at Thebes (Fig. 5). Here the woman is being led to a ship apparently by the captain who holds her by the wrist.⁵ The wreath in both scenes alludes to a successful incursion.

¹ Paus. I, 41, 4.

² Cf. Valentin K. Müller, *Der Polos, die griechische Götterkrone*, p. 63; Tod and Wace, *A Catalogue of the Sparta Museum*, p. 158, nos. 201, 202, 203, where she appears between the Dioscuri. *Ann. d. Inst.* 1861, tav. D.=Fig. 3. *B.S.A.* 1896-7, p. 161.

³ Cf. Perdrizet, *B.S.A.* 1896-7, p. 162.

⁴ Petersen and von Luschan, *Reisen in Lykien*, II, pp. 168 f., who first published this relief believe the figure here interpreted as Nike is rather "eine würdevolle Frauengestalt mit breit von dem hohen Kalathos herabhängendem Schleier." They date it in the first century B.C.

⁵ *J.H.S.* 1899, pl. VIII.

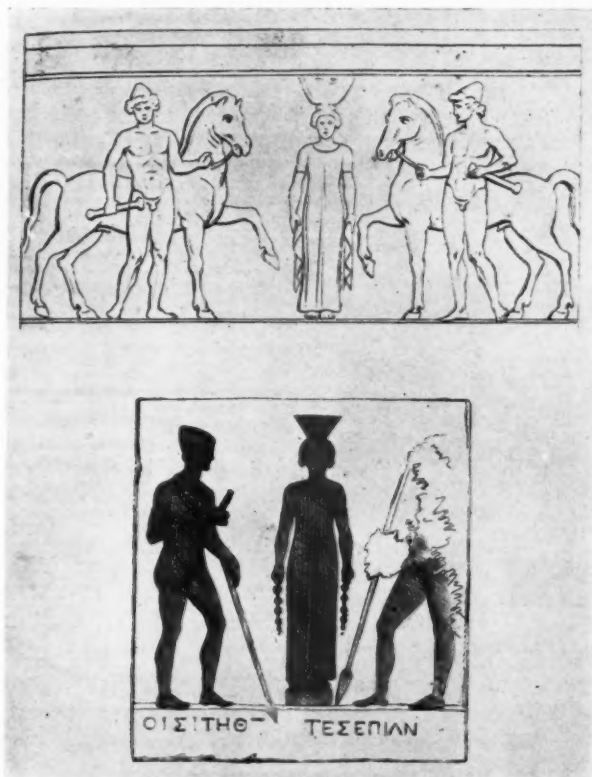
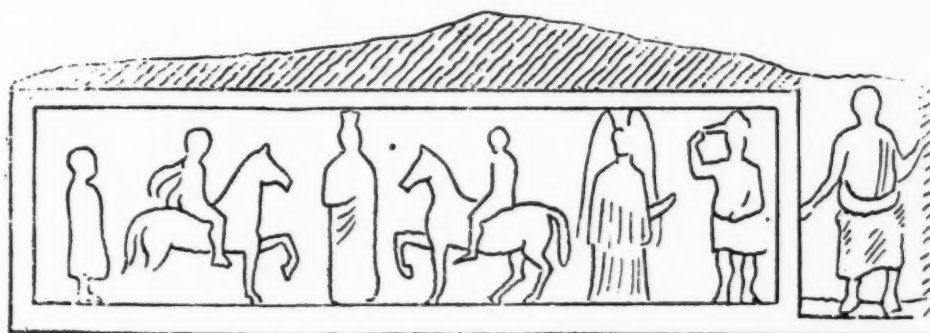


FIG. 3.—HELEN WEARING POLOS



.....ΟΣΑΡΤΕΝ // ΔΟΔ.....ΗΣΕΡΜΕΙΚΑΙΔΙΟ...

.....ος Ἀρτεμ[ι]δοης Ἑρμῇ καὶ Διο[σκούροις]

FIG. 4.—ROCK-CUT RELIEF AT ALIFARADIN

There remains the fifth figure, which in the literary version of the story is Aethra. Does the small figure of a suppliant behind the goddess in the vase-painting represent Aethra? She is not placed as Pausanias saw her on the chest of Cypselus. There seems to be some special point in her short dress which in later art is regularly worn by Artemis and the Amazons. An Artemis is out of the question in this scene. It may be that Aethra, the mother of Theseus, has been given the short skirt of the Amazon wife of Theseus, Antiope. It is of course possible that the vase-painter represents Antiope as seeking sanctuary with Athena Parthenos when the Dioscuri captured



FIG. 5.—DETAIL OF A GEOMETRIC VASE

Athens during the absence of Theseus. Later Athenian vase-painting offers several examples of female suppliants at the image of Athena.¹ In these the goddess carries her shield in front view and her spear in horizontal position. Even the checkered garment of the Protocorinthian Athena appears in a representation of the goddess on a vase attributed to Exekias.² The sphinxes which frame the group remind one of those which Pausanias saw under the horses of the Dioscuri on the throne of

the Amyclaeon Apollo (III, 18, 14). The scene on the vase, if correctly interpreted, is not the only appearance of Helen and the Dioscuri in Protocorinthian painting. A lekythos also discovered at Thebes represents the rape of Helen by Theseus and Pirithous in the presence of the Dioscuri.³

The aryballos of the Ashmolean museum not only gives us the earliest known Greek cult image but the earliest representation of the armed Athena Parthenos and the prototype of the warrior goddess of the Panathenaic amphorae.

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¹ Overbeck, *Gallerie heroischer Bildwerke*, pls. 26-27.

² Cf. Hoppin, *Handbook of Greek Black-Figured Vases*, p. 108, No. II; Gerhard, *E.C.V.*, Pl. XXII.

³ *J.H.S.* 1912, p. 347, Fig. 24.

THE MENON PAINTER = PSIAK

PLATE XXXVIII

AMONG the pioneers of red-figure the "Menon Painter" (that is, the painter of the amphora in Philadelphia signed *ΜΕΝΟΝ ΕΠΟΙΕΣΕΝ*)¹ occupies a prominent place. His works, like those of the Andokides Painter, reflect the dainty refinement of the Peisistratid era and form a strong contrast with the simpler, bolder compositions which presently came into vogue. But though addicted to elaboration he was an experimenter. He worked in both black-figure and red-figure, he used unusual technical devices, and he was lured by the new interest in perspective into placing some figures in surprisingly bold attitudes.

H. R. W. Smith in his *New Aspects of the Menon Painter*² gave an excellent account of this artist's style, and made several new attributions to him including a kylix with warriors in New York—which is closely connected with the amphora in Philadelphia not only stylistically but by the fact that the two have in common the technical features characteristic of the work of this painter.³ J. D. Beazley further enlarged our knowledge of this painter by ascribing several additional works to his hand.⁴

The object of this article is to try to prove that the Menon Painter is identical with Psiax who signed his name as decorator on the two alabastra in Odessa⁵ (Pl. XXXVIII, fig. 1) and Karlsruhe⁶ (fig. 3), and whose name appears (without an accompanying verb) on two eye kylikes in Munich⁷ and New York.⁸ That the styles of the Menon Painter and Psiax were intimately related was already observed by Smith,⁹

¹ E. H. H(art), *Mus. J.*, 1914, pp. 31–37.

² Published by the California University Press in 1929; previously read as a paper before the general meeting of the Archaeological Institute of America in 1926 (cf. *A.J.A.* XXXI, 1927, p. 83, where the attributions were listed).

³ Incisions for spearheads, white or red (only discoloration remains on New York kylix) for the manes and tails of horses, and applied buff clay for spear shafts (not white, by the way, as Smith thought, *op. cit.*, p. 15; for distinct traces of the applied clay remain both on our kylix and the Philadelphia amphora, on the latter applied over black relief lines). Applied clay is used for spear shafts and other details also on the Menon Painter's cup in Munich (according to Hauser, *Jb. Arch.* I. X, 1895, p. 153). Incisions for parts of weapons appear also on his Munich cup (cf. Smith, *op. cit.*, p. 1), on a fragment of a kylix by him in Leningrad (cf. fig. 9 and n. 4), and on his aryballos formerly at Bologna (cf. Smith, *op. cit.*, pp. 7, 15, 16, who makes the important observation that these particular renderings cannot be paralleled elsewhere).

⁴ Cf. his list of seventeen given in *J.H.S.* XLVII, 1927, p. 97 (including six attributions made by Buschor, Langlotz, Pfuhl, Zahn, and Smith); in *J.H.S.* XLIX, 1929, p. 109, he added an amphora in Copenhagen, and later he withdrew the amphora F201 in the Louvre, attributing it to the Antimenes Painter, a close companion of the Menon Painter. Since then, he writes me, he has added an amphora in Palermo. To Beazley's and Smith's lists may be added, besides the Psiax vases discussed in this article, two important attributions made by A. Peredolski—a black-figured kylix in Odessa and a fragment of a red-figured kylix in the Hermitage, here reproduced in figs. 8 (exterior, side A) and 9 by her kind permission. The Odessa kylix will be mentioned in her forthcoming book *Meisterwerke des schwarzfigurigen Stils in der Ermitage*. I saw both pieces in Leningrad in 1930.

⁵ Hoppin, *Handbook of Red-figured Vases*, II, pp. 402–403; von Stern, *Memoiren der Odessaer Gesellschaft*, XVII, 1894, and *Arch. Anz.*, 1894, p. 180.

⁶ Hoppin, *op. cit.*, pp. 396–397.

⁷ Hoppin, *op. cit.*, pp. 398–399.

⁸ Hoppin, *op. cit.*, pp. 400–401.

⁹ *Op. cit.*, p. 25.

and that the two artists might be identical was envisaged as long ago as 1913 by Beazley.¹ A study of the Odessa alabastron based on new photographs of it (cf. Pl. XXXVIII),² and a further study of the Karlsruhe alabastron (fig. 3)³ enable me, I believe, to make this identity certain.

Let us first take the hoplite who occupies one side of the Odessa alabastron (fig.



FIG. 1.—DRAWINGS OF THE TWO FIGURES ON PLATE XXXVIII

¹ *J.H.S.* XXXIII, 1913, p. 143; cf. also his remark in *J.H.S.* LI, 1931, p. 120: "Psiax, on the other hand, still appears to me very like the Menon Painter. I wish Mr. Smith would undertake a study of the four signed Psiax vases starting with the cup in New York." Mr. Smith's scepticism of the identity of the two painters (kindly communicated to me by letter) and his present preoccupation with other problems are my excuse for undertaking the task.

² I owe these photographs to the kindness of Dr. Waldhauer. Fig. 1 shows drawings traced by Lindsley F. Hall from these photographs, omitting floral scrolls.

³ The photographs were kindly sent me by the authorities of the Bad. Landesmuseum, Karlsruhe.

1, Pl. XXXVIII, left) and compare him with the New York warriors attributed to the Menon Painter (Cf. fig. 2).¹ The resemblance between the two is so striking that the Odessa youth could enter the New York battle and fit harmoniously into the picture. The same delicate, miniature style; the same types of helmet, shield, and greaves; the same dainty, boneless hands; the short, straight lines for the serratus magnus; the characteristic delicate profile with short upper lip; the circle and dot for iris and pupil; the delicate fringe of hair. And even more convincing are the renderings of certain details—the red edging of the long crest,² the use of red for



FIG. 2.—WARRIORS ON A KYLIX IN NEW YORK ATTRIBUTED TO THE MENON PAINTER

the pad at the bottom of the greave,³ the hatched hand-grip of the shield with the loose ends hanging down on either side, the clenched hand holding it with the thumb passing across the index and second fingers. It does not seem likely that two different persons would draw in this identical manner.

The archer on the other side of the Odessa alabastron (fig. 1, Pl. XXXVIII), though

¹ From a drawing by L. F. Hall. (The ends of the finger tips of the left hand of the warrior to the right have through some slip been omitted in the drawing). Cf. also the other warriors on this kylix (Smith, *op. cit.*, Pl. 2).

² Cf. the fourth warrior from left on the New York kylix (Smith, *op. cit.*, pl. 2).

³ Cf. the warrior lifting one leg on the New York cup (Smith, *op. cit.*, pl. 3, and p. 13), and the warriors on the Munich cup (Smith, *op. cit.*, p. 13, note 9).

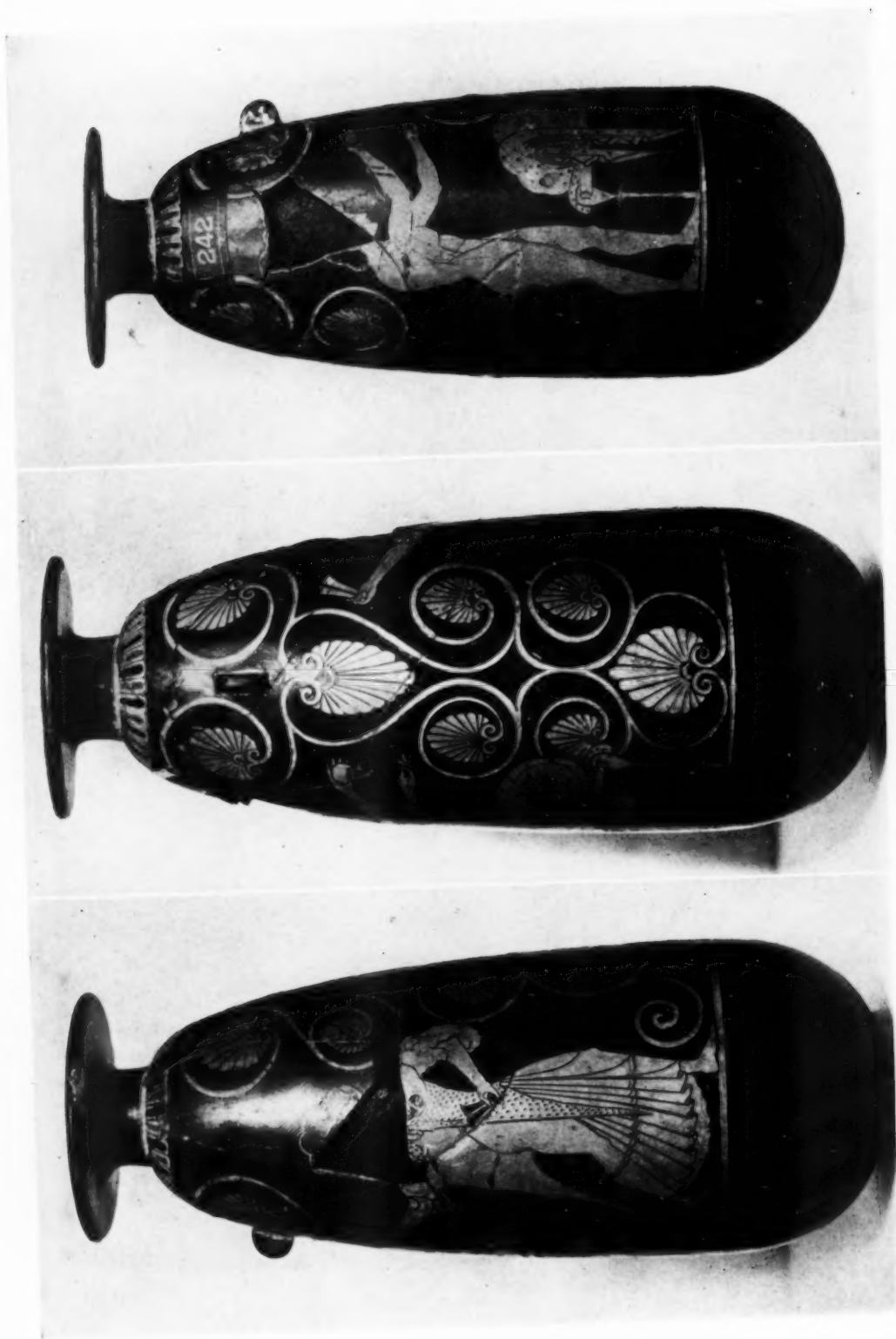


FIG. 3.—ALABASTRON SIGNED BY PSIAX, IN KARLSRUHE

FIG. 4

FIG. 5



FIG. 4.—FROM A LEKYTHOS ATTRIBUTED TO THE MENON PAINTER



FIG. 8.—PERSEUS ON A KYLIX IN ODESSA ATTRIBUTED TO THE MENON PAINTER



FIG. 5.—MAENAD ON AN AMPHORA IN MUNICH ATTRIBUTED TO THE MENON PAINTER



FIG. 6.—ARTEMIS ON THE AMPHORA BY THE MENON PAINTER, IN PHILADELPHIA



FIG. 7.—APOLLO AND ARTEMIS ON AN AMPHORA IN MADRID ATTRIBUTED TO THE MENON PAINTER

he does not present so many specific points for comparison with similar figures by the Menon Painter, is nevertheless clearly of the same breed. We may compare him especially with the black-figured archer on a plate in the British Museum,¹ whose long-sleeved jacket and trousers have a similar all-over pattern; who also has broad decorative bands on the trousers; whose bow-case is of similar shape with long, narrow fox-tail cover, and whose headdress, though of a different form, also leaves the ear uncovered. And again a significant detail. The hands with drooping fingers so curiously unstructural, so charmingly decorative, resemble no hands so closely as those of Artemis on the amphora by the Menon Painter in Philadelphia² (cf. fig. 6).

When we pass to the figures on the Karlsruhe alabastron we can again make striking comparisons. The castanet player (fig. 3) who occupies one side is surely the twin sister of the black-figured dancer on a lekythos attributed to the Menon Painter³ (fig. 4). Same stance, similar outline, similar folds, same lower edge of chiton, similar limp fingers. Identical castanets (with two strokes near the lower edge and a third a little higher up) appear also in the red-figured dancers in Munich⁴ (fig. 5) and Madrid,⁵ both attributed to the Menon Painter; and, curious though it may seem, just this rendering is difficult to parallel elsewhere. Significant is also the drawing of the further edge of the right sleeve. It is rendered as an arc of slightly wavy, hesitant outline laid on the forearm with a little circle (for the button) where it meets the near edge of the sleeve. This arc, generally of wavy outline and regularly with a little circle at one end, appears again and again on chiton sleeves by the Menon Painter. We see it on the black-figured lekythos above mentioned (cf. fig. 4), the amphora in Philadelphia (Leto), the amphora in Madrid (cf. fig. 7)⁶, the amphora in Munich, the alabastron in the Hermitage, the kylix in Odessa (cf. fig. 8 and note 4, p. 547). It occurs in both his black-figured and red-figured work so uniformly as to serve almost as a hall-mark of his style. Of course similar renderings appear in the works of other artists; for the indication of the further edge of the sleeve as an arc laid on the arm was a convention current at that particular time; but in these the design is almost invariably different—the arc has not a wavy outline, or it is double, or the circle for the button is larger, or has a central dot, or is omitted.⁷ To duplicate exactly Psiax's rendering is difficult—except in the work of the Menon Painter.

For the youth on the other side of the Karlsruhe alabastron (fig. 3) there is no such striking parallel among the extant works of the Menon Painter as for the dancer; but the general style fits admirably. The picture is drawn with the meticulous execution, the slightly hesitant line, and the elaboration of detail which are the distinguishing traits of the Menon Painter. And the individual forms also cor-

¹ B 591, cf. Smith, *op. cit.*, pl. 4.

² Cf. Hall, *op. cit.*, p. 32, fig. 17. I owe this new photograph to the kindness of Mrs. Dohan.

³ By Beazley; no. 13 in his list of *J.H.S.* XLVII, 1927, p. 92. My fig. 4 is reproduced from the *Sale Catalogue of the Collection of Dr. O. B(ourignon) and M. C(anessa)*, Paris, Hotel Drouot, May 19-21, 1910, no. 188, pl. XVI. I have not been able to ascertain the present whereabouts of this vase.

⁴ Cf. Smith, *op. cit.*, p. 47, fig. G; Richter, *Ancient Furniture*, fig. 166.

⁵ Melida, *Corpus Vasorum, Madrid, Musée arch.* fasc. I, pl. 26, 1.

⁶ From a photograph by Marie Beazley.

⁷ Cf. e.g. Pfuhl, *Malerei und Zeichnung*, figs. 333 (Skythes), 360 (Oltos); Hoppin, *op. cit.*, I, p. 305 (Epiktetos), etc.

respond—the delicate profile line, the circle instead of dot for the iris, the straight lines for the serratus magnus, the loosely held hands.

From these comparisons, general and specific, it seems clear to my mind that the painter who signed himself Psiax on the two alabaster is the same person as the painter whom we have been calling the Menon Painter.

But our problem is not yet at an end. We still have left for consideration the two eye kylikes which bear the name Psiax, without a verb, in Munich and New York. The former has a black-figured Satyr on the inside and a red-figured warrior on the outside (fig. 10),¹ the latter, two black-figured birds inside and a Pegasus outside.



FIG. 9.—FRAGMENT OF A KYLIX IN LENINGRAD ATTRIBUTED TO THE MENON PAINTER



FIG. 10.—WARRIOR ON A KYLIX WITH THE NAME PSIAK IN MUNICH

At first sight it is apparent that these figures are not in the same class as those we have been considering. They are sketchily drawn (especially the warrior) and do not show the painstaking detail which distinguishes the work of the Menon Painter. And since the name Psiax occurs here without the verb "egraphsen" and is therefore not necessarily a signature, it would be perfectly possible to eliminate the cups from the argument. But certain stylistic and technical considerations point a different way. The warrior on the kylix in Munich is not comparable in quality, it is true, with the warriors on the New York kylix and the Odessa alabastron. But he has the same red edging on his crest that we noticed on the Odessa and New York warriors and which is rare elsewhere; and he has red balls on his shield, like one of the New York warriors.² They are arranged, however, as a border instead of a shield device, as also in the black-figured warrior in Berlin by the Menon Painter.³ More important still, the Pegasus on the New York cup has a technical detail which connects it directly with the work of the Menon Painter. Some of the interior markings—the hair of the mane and some muscles on neck and body—are lightly incised instead of painted,⁴

¹ I owe this new photograph—made after the disturbing restorations of the head were removed—to the kindness of Dr. Sieveking.

² Cf. Smith, *op. cit.*, pl. 2.

³ Cf. Furtwängler-Reichhold, *Griechische Vasenmalerei*, pl. 154, 2 [Zahn].

⁴ Beazley, *Attic Red-figured Vases*, p. 6, called attention to this interesting point.

a practice inherited from black-figure. And this curious rendering occurs on very few vases of this period,¹ among them the amphorae in Philadelphia and Munich² by the Menon Painter, and the alabastron in Karlsruhe signed by Psiax! Furthermore, stylistically the Satyr on the Munich cup is not unlike the Satyrs by the Menon Painter,³ and the New York Pegasos could pass for a simplified version of a Menon Painter's horse. It seems best, therefore, to regard the Munich and New York eye kylikes as related to Psiax, either as products of his atelier or as rapid works by the master himself. They would then stand in the same relation to Psiax as the lekythoi in Berlin, Athens, and Syracuse which have the name of Douris but not his signature stand to that artist⁴—secondary works, possibly but not necessarily by him.

With these two kylikes placed in the periphery of Psiax our theory becomes, I think, convincing. The style of Psiax as revealed to us by the alabastra in Odessa and Karlsruhe is so close to that of the Menon Painter that the conclusion seems inevitable that Psiax is identical with the artist provisionally called the Menon Painter. It may seem odd, of course, that he signed the two little alabastra and left unsigned his more significant work. But since other vase painters did the same, that is, signed comparatively minor works and not their masterpieces,⁵ this circumstance presents no difficulty. We may drop, therefore, the name Menon Painter for this distinguished artist—difficult though it is to change the name of an old friend—and substitute the name Psiax.

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¹ Listed by Beazley, *Ibid.*

² Cf. Reichhold, Furtwängler-Reichhold, *Gr. Vasenmalerei*, I, p. 151.

³ Cf. e.g. the black-figured ones in Copenhagen (*C. V. A., Copenhagen*, pl. 107, Ic), on the alabastron in the Hermitage, the amphora at Castle Ashby, and the red-figured one on the amphora in Munich.

⁴ Cf. Beazley, *Att. Vasenmaler*, p. 210.

⁵ For instance, Myson, who signed the hastily executed krater found on the Akropolis and not the magnificent pots in the Louvre and the British Museum.

IRON, PREHISTORIC AND ANCIENT

PLATE XXXIX

FIFTY years ago a controversy arose between the proponents of a high antiquity for man-made iron and those maintaining a similar position with regard to bronze. In an admirable and interesting work St. John V. Day ¹ summed up the case for iron while the precedence of bronze was upheld by the redoubtable Gladstone ² and a galaxy of scholars. Archaeological evidence, though not wanting, lacked its present authority and the conflict was waged around classical legend and the cultural significance of a few undocumented objects of early iron and bronze. Echoes of that controversy still reverberate as current tradition—none more persistent than a widespread belief that industrialization of iron first occurred in the East. The truth in the matter appears now to be precisely the reverse. There is no warrant for either bronze or iron in the Orient until after their appearance in Europe, where, as most authorities are at present agreed, the Bronze Age ³ begins about 2000 B.C. and the Iron Age ⁴ opens one thousand years later.

Obviously such a chronology is concerned only with palpable evidence of industrial usage, and it rejects as sporadic, hence meaningless, the occurrence of the following antiquities:

BRONZE				
	Place	Object	Date B.C.	Period
Egypt	Medûm	Rod ⁵	2980-2900	III Dynasty
Egypt	Memphis	Statue ⁵	2625-2475	VI Dynasty
IRON				
	Place	Object	Date B.C.	Period
Egypt	El Gerzeh	Beads ⁶	4000	Predynastic
Egypt	Great Pyramid	Plate ⁶	2900-2750	IV Dynasty
Egypt	Abusir	Picks ⁶	2750-2625	V Dynasty
Egypt	Abydos	Lump ⁶	2625-2475	VI Dynasty
Mesopotamia	Ur	Dagger ⁷	2278-2170	Sumerian
Crete	Knossos	Cube ⁷	1800	M. M. II
Greece	Vaphio	Ring ⁷	1500	Mycenaean
Greece	Kakovatos	Ring ⁷	1500	Mycenaean
Egypt	Tut-ankh-amen	Dagger ⁸	1350	XVIII Dynasty
Egypt	Ramses III	Halbert ⁸	1198-1167	XX Dynasty

Inadequate documentation also tends to invalidate both items of bronze and three of the earlier iron objects from Egypt. That the El Gerzeh beads and the dagger of Ur are meteoric rather than terrestrial iron has now been established beyond reasonable doubt.⁹

¹ St. John V. Day, *The Prehistoric Use of Iron and Steel*, 1876.

² W. E. Gladstone, *The Time and Place of Homer*, 1876.

³ "Archaeology," *Encyclopaedia Britannica*, 14th Edition, Vol. 2, p. 247.

⁴ *A Guide to Early Iron Age Antiquities, British Museum*, Table XII, for a chronology of the Hallstatt period.

⁵ H. Garland, C. O. Bannister, *Ancient Egyptian Metallurgy*, 1927.

⁶ *A Guide to Antiquities of the Bronze Age, British Museum*, p. 172.

⁷ T. A. Rickard, "Iron in Antiquity," *The Journal of the Iron and Steel Institute*, No. II, 1929.

⁸ Howard Carter, *The Tomb of Tut-ankh-amen*, 1927.

⁹ See Note 5, p. 573.

A relatively late dating for iron (1000 B.C.) and bronze (2000 B.C.), moreover, accords with the pre-historical synthesis wherein generations of men are revealed content merely to turn the inherited environment to slightly better account. Thus the evidence of object and inscription alike bear witness that Egypt was dependent on copper long after bronze appears at Troy II (2400–1900 B.C.).¹ Here certainty ends and speculation begins. Anatolia without tin is no more acceptable as the birthplace of bronze than Akkad or Sumer. Perhaps the frequent occurrence of early Trojan forms in the Danube² valley may be more than a clue; in any event, it is safe to assume that the bronze worker of Troy obtained tin from Bohemia.

The origin of iron seemingly presents a more difficult problem. Its ores are found everywhere—a fact often invoked to substantiate claims for this or that region to priority of discovery. The premise is sound, but the conclusion is apt to be weak unless it connotes the available ore as that best adapted to a rudimentary technique. Iron occurs in various forms—and the chief concern then, even as now, was not one of amount, but the kind, and whether the ores within reach could be reduced economically. Fifty years ago the enormous deposits of the Lake Superior district were similarly in question—a doubt happily resolved by the timely invention of the basic process and an ingenious system of transport.³

The problem of origin, thus circumscribed, is further conditioned by an obvious lack of technical knowledge in many localities. Even with suitable ores, a claim, to be sound, must also imply the ability and the need to invent a new process. Let it again be repeated that “origin” or “discovery,” as the term is used here, means the production in quantity of a variety of forms. Rings, amulets and beads, casual by-products of the copper-bronze era, are not especially significant. But when iron weapons and implements begin to appear—when these objects grow larger and their numbers tend to increase—then, and then only, the fact becomes clear that the production of iron has really begun. Obviously this would occur first where good ores are abundant, and where the fundamentals of metallurgy had been gradually acquired through prior experience with copper or bronze. Economic necessity may have forced the event. In a primitive world where competition was the law of physical survival the momentum of industry was usually in proportion to the amount of pressure exerted immediately beyond the ethnic frontier.

Metallurgically, the operation of this is discernible in the rapid advance of some regions to a developed bronze culture, and in a seeming reluctance to take the next step and go forward with iron. Egypt perhaps offers the classic example. For centuries her metallurgists kept the pace, skilfully adapting a remarkable copper-working technique to the production of bronze. This was no easy transition, for, without

¹ Though bronze bolts, a vase and an offering table are mentioned in the records of the XII Dynasty (2000–1788 B.C.) it is not until the XVIII Dynasty (1580–1350 B.C.) that the references become general and include, among other items, bronze armor and weapons. These, for the most part, appear to have been booty or tribute collected by Thutmose III (1501–1447 B.C.) in his Syrian campaigns. In the records of Ramses III (1198–1167 B.C.) occur the first references to the actual making of bronze. Cf., James H. Breasted, *Ancient Records, Egypt*, Vol. I, 483, 500, 534; Vol. II, 45, 435, 447, 501, 802, Vol. IV, 202, 343.

² V. Gordon Childe, *The Dawn of European Civilization*, 1925, p. 57.

³ The basic process was invented in 1878 by Thomas and Gilchrist.

supplies of her own, tin was obtainable only through conquest or trade. But the vigor was lacking in the closing phase of a war-worn Empire (1200-1090 B.C.) to abandon bronze and take up iron. No doubt the Egyptian metallurgists had knowledge of it; vague rumors, even specimens, of the marvelous new metal were bound to have filtered in. Some attempts may even have been made to apply it, but in face of the difficulties, these would soon be abandoned. At tremendous cost a stable and profitable bronze industry had been built up; bronze had in the past met every need and, as far as could then be seen, would continue to do so. Conceivably, iron might be a metal of future promise, but in the immediate present it was no harder, no more durable, and was infinitely less beautiful than the familiar bronze. Successful reduction demanded, moreover, radical changes in the existing technique. Most important of all, good ores were required—and where were such ores to be found?

Here there is a divergence of responsible opinion. Some authorities maintain that iron, as well as copper, was present in the deposits of the Sinaitic peninsula; others claim, on the contrary, that no iron is to be found there now and that it never existed. A few Egyptologists have pointed to distant Nubia as a probable source; but the oldest known mining sites there appear to be Roman.¹ That these deposits were not worked until a comparatively late date is also implied by Herodotus. He specifically comments, and with an obvious emphasis, that the Ethiopians marching in the host of Xerxes carried "short arrows pointed not with iron but a sharpened stone."²

The point really at issue in such discussions of fact is not whether iron ores were available, but rather what kind. Low grade hematites of the variety mined in Egypt³ to-day would be practically worthless to a primitive industry because of the deleterious oxides which form the gangue. Thus concept and evidence combine to refute the pretensions of Egypt. There is no valid authority for iron among the Egyptians before the Assyrian conquest.⁴

In the Tigris-Euphrates valley, as along the Nile, the tide of early civilization advanced with copper, and receded with bronze. Iron, if known, was exceedingly rare and never attained industrial rank except in Assyria. And though an inscription of Tiglath-Pileser I⁵ (1125-1100 B.C.) is frequently cited as proof of an earlier dating, there is no warrant in fact for Assyrian iron until the eighth century B.C. It is important to observe, however, that the iron hoards found at Khorsabad, Nimrud and Nineveh⁶ are the earliest known of any considerable size in the ancient East.

¹ H. Garland, C. O. Bannister, *op. cit.*, p. 85.

² Herodotus, VII, 69.

³ "In West Sinai there appear iron and manganese ores in pockets wherever the carboniferous limestone outcrops. In the eastern desert of Egypt there are three districts, Wadi Dib, Abu Marwat and Abu Jerida where iron ores are displayed in fair amounts and of good quality." *Iron Ore Resources of the World*, The Eleventh International Geological Congress, Stockholm, 1910.

⁴ In the opinion of Ebert, "one cannot distinguish an iron culture in Egypt before the middle of the second century B.C." Cf., "Eisen," *Reallexikon der Vorgeschichte*, Vol. III, Section 1.

⁵ "At the bidding of Urta, who loves me, four wild bulls which were mighty and of monstrous size in the desert in the country of Mitani and near to the city of Araziki which is over against the land of Hatti, with my mighty bow, with my iron spear, and with my sharp darts, I killed." D. D. Luckenbill, *Ancient Records, Assyria and Babylonia*, Vol. I, p. 247.

⁶ At Nimrud (the original section of what later became the Assyrian city of Nineveh) the palaces of Ashurnasirpal III (883-859 B.C.), Shalmaneser III (858-824 B.C.) and Tiglath-Pileser IV (745-727 B.C.) were excavated by Layard. Numerous iron objects were found among the remains of Ashurnasirpal's palace—daggers, spear-heads, arrow-heads, parts of a helmet, fragments of armor, axes, sickles,

Significant, too, is the fact that they occur in Assyria with its flanks in the Caucasus and on the central plateau of Asia Minor.

The classical tradition has led many authorities to accept northeast Asia Minor, or the Caucasus, as the probable source of the metallurgical art and the birthplace of iron. Thither sailed the Argonauts in quest of the golden fleece; there dwelt the Chalybes, most renowned of the iron-workers in all antiquity. But whence the Chalybe tradition came is vague, though the allusions of Aeschylus¹ point to a Scythian origin.

Syria-Palestine, in spite of its later renown, does not appear to have been an early worker of iron. From first to last its industrial-commercial activities were determined by the usage of Egypt and Babylonia for whom it alternately served as a region of trade or a field for conquest and plunder. It is entirely admissible that the exiled Aegeans, the Philistines of Hebrew history, had knowledge of iron in the tenth century B.C. Such knowledge, however, would have come from the West and its roots must be sought in Europe.

China and India were too far removed from the stream of developing western civilization to have contributed to, or been influenced by, the early working of iron. No piece of metal found in China can be dated prior to 1200 B.C.;² and the earliest recorded use of iron goes back only to the eighth century. India, whose civilization is apparently later than that of China, seems to have passed directly from the use of copper to that of iron with no intermediate bronze culture. On the evidence, any early dating for iron is inadmissible at present. It can only be claimed with reasonable assurance that in 326 B.C. the supreme excellence of Indian iron became known to the western world through the conquests of Alexander.

The theory of a Central European origin for iron is not new. More than thirty years ago Sir William Ridgeway suggested³ that the Achaean invasions of about 1400 B.C. brought iron into Greece; and he sought to trace through the arms of the Achaeans before Troy certain affinities with Hallstatt. Whether the Achaeans brought iron into Greece may be open to question; but that the Dorians did, there can be no doubt. Thus by 1000 B.C., at the latest, iron was reaching the Mediterranean coasts from beyond the Danube.

In substance, then, archaeological evidence establishes the time when man first produced iron for weapons and implements at about 1000 B.C. It points unmistakably to Central Europe and the Assyrian uplands as the most probable places of origin. Nowhere else, with anything like a comparable dating, have objects been found in sufficient quantities to warrant a belief that iron had come into general use.

saws, a pick, hammers, locks, finger rings, bracelets and a bronze bell with an iron clapper. Here is variety sufficient to justify a ninth century dating were it not for the fact that Sargon II (722-705 B.C.) is known to have restored the palace of Ashurnasirpal and converted it into a storehouse for treasure and booty. The excavations of Victor Place uncovered in the palace of Sargon at Khorsabad (Dur-Sharrukin) a quantity of iron estimated to weigh approximately 175 tons. Grappling-hooks, chains, picks and mattocks were found, together with numerous bars, or billets, drawn out at each end and pierced with a hole for facility in transport. Cf., Austen Henry Layard, *Nineveh and Its Remains*; Victor Place, *Ninive et l'Assyrie*; Percy S. P. Handcock, *Mesopotamian Archaeology*.

¹ Aeschylus, *The Seven Against Thebes*, 727-733.

² James H. Breasted, *The Conquest of Civilization*, 1926.

³ Sir William Ridgeway, *The Early Age of Greece*, I, 1901.

And if precedence for the West is claimed here it is only because, in addition to the evidence of objects, Central Europe appears more nearly to fulfill the combined premised conditions of available ore, metallurgical knowledge and the economic necessity to develop iron.

II

At the opening of the second millennium, the cultural gap between the East and the West was perceptibly closing.¹ Barter and exchange were common and fairly continuous between Europe and the Levant at adjacent points, or along the coasts. Metals, salt, amber, pottery, implements and fabrics were the commodities most in demand. The wares of Egypt, borne in her own ships,² were then being distributed among the Aegean islands and in Crete, whence in Cycladic bottoms they were transported west as far as the Pillars of Hercules and north to the Troad, from which points, and others intermediate, a commercial penetration of Europe had long since begun.

Overland and by inland stream the raw materials of Europe were reaching the coasts.³ Lead, silver and copper from Spain, tin and possibly a species of natural bronze⁴ from Cornwall⁵ or Bohemia, returned inland again in the form of implements, weapons and ornaments. Powerful communities grew up at the various entrepôts, notably in Spain and on the Hellespont, at which latter point Troy II (2400-1900 B.C.) was already a thriving industrial center. Trade with Central Europe⁶ was continuous and relatively easy from there, by way of Maritza, Morava and the Danube valleys.⁷

It was precisely here, in the upper Danube valley, in a district corresponding to modern Bohemia, Bavaria and Austria, that two streams of Eurasiatic civilization met and struggled for industrial supremacy. For about 2000 B.C.⁸ there arrived in Bohemia, coming by way of Spain, Sardinia and north Italy, a people, named from the character of their pottery the Bell Beaker Folk. Little is known of their antecedents, but it is evident that they were metal workers of skill and experience; further-

¹ Breasted, *The Conquest of Civilization*, pp. 38, 57.

² Breasted, *op. cit.*, p. 67.

³ J. de Morgan, *Prehistoric Man*, p. 274.

⁴ "The presence of a small percentage of tin—anything from .50 to 2.00% need not imply an intentional addition, because the impure ores from which the implements were made have been shown to contain the same admixture; the tin was in these cases not added by man with the object of hardening the metal, and consequently the implements are copper, and not a poor quality of bronze. Such natural admixtures are most frequent, and offer the highest percentage of tin, in areas where tin ores also occur." *A Guide to the Antiquities of the Bronze Age, British Museum*.

⁵ "In Cornwall where copper and tin ores are found together, the earliest metal implements consist of what may be termed a 'natural bronze.'" J. Newton Friend, *Iron in Antiquity*, p. 20.

⁶ "In a lecture before the Royal Anthropological Institute on the Aegean and Danube valley in the second millennium B.C., V. G. Childe states: 'The central European Bronze Age was the child of the Aegean, but eventually turned upon its parents and devoured them. Recent excavations in Hungary and Macedonia have thrown light on this double process. In the lowest strata at Toszeg near Szolnok on the Tiza, the connection with Troy is clearly revealed in the pottery, and at the same time a link is found with the early Bronze Age civilization that arose around the tin deposits of Bohemia. In the fourth layer at Toszeg an intrusive pottery appears, neither native nor Macedonian, but originating around the head-waters of the Adir and March.'" *Nature*, July 23, 1927, p. 138.

⁷ John Garstang, *The Hittite Empire*, pp. 39, 40.

⁸ "Archaeology," *Encyclopaedia Britannica*, 14th Edition.

more, and in contradistinction to the Trojan traders, the Bell Beaker Folk appear to have been colonizers.¹ In any event, coincident with their arrival a definite metal culture arose in Central Europe, which, known as the Aunjetitz, spread over Silesia, Saxony, Moravia, Bavaria and Bohemia. This was followed less than five hundred years later by a more developed metal industry, the so-called Lausitz culture, which appears to have included the working of bronze.²

Thus by the middle of the second millennium, the peoples of Central Europe had arrived at a metal culture comparable in its basic principles with that of the ancient East; and, what is even more astonishing, in a few hundred years they had accomplished a development which had taken the Orient as many thousands to achieve.

Shortly after 1500 B.C. the Lausitz people coalesced with newly arrived dwellers in the Hungarian plain, and together they spread in every direction. The socket and tang now make their appearance.³ Thereafter weapons of all kinds grow larger and heavier; sword blades are longer and frequently expand in the middle. Thus was developed the leaf-shaped sword of Central Europe, the most formidable offensive weapon yet invented by man.⁴

While these momentous events were taking place in Europe, the long mounting tide of eastern civilization was overflowing its traditional boundaries. The standards of Egypt, through the vigorous campaigns of Thutmose III (1501-1447 B.C.), had been planted on the upper waters of the Euphrates, and all Syria-Palestine paid tribute to the Pharaoh. From far-off Babylon and beyond Taurus where dimly discernible an Hittite Empire was rising to power, came messages⁵ of good-will and respect for the mighty Empire of Egypt. The star of Assyria had not then risen; the conquests of Chaldaea and Persia lay yet a thousand years off.

Amid the confused struggles of these eastern nations at death-grips, the clash of metal upon metal is heard above the din, but always it is that of copper⁶ or the newly discovered bronze, never the ring of iron. It is better bronze or copper perhaps, and the weapons themselves are more skilfully executed, more beautifully ornamented, but, after all, no more destructively serviceable than those of Europe.

One hundred years after Thutmose, the Hittite Empire, dominating the central plateau of Asia Minor, had come into being, and emigrants from Thrace, Thessaly, even distant Illyria, had settled in the Troad; or, ascending the Sangarius (Sakaria) Valley, were to be met as far east as the Halys (Kizil Irmak) River.⁷ For throughout the fifteenth and fourteenth centuries a rising tide of European migration was in full motion southward. In the van marched the Achaeans, who rapidly conquered Mycenaean Greece, stormed Crete, and swarmed over the islands of the Aegean. Less than a hundred years later these Achaeans themselves were upon the sea, raiding Cyprus and the coasts of Egypt and struggling for a foothold in Asia Minor.⁸ Meanwhile, in successive waves, the emigrants from Europe had been crossing the Bosphorus. Records of the thirteenth century indicate that the Hattic kings were

¹ *C.A.H.*, Vol. I, 1924, pp. 100, 108.

² "Archaeology," *Encyclopaedia Britannica*, 14th Edition.

³ Ridgeway, *op. cit.*, p. 607, credits these European peoples with the invention of the socket and tang. Woolley's recent discoveries are implicit that the Sumerians were using the socket at a much earlier date. Cf., C. L. Woolley, *The Sumerians*, p. 42.

⁴ Breasted, *A History of Egypt*, 1912.

⁵ Breasted, *op. cit.*, p. 469.

⁶ Breasted, *The Conquest of Civilization*, p. 272.

⁷ John Garstang, *op. cit.*, p. 10.

aware of impending disaster and sought to avert it through alliance and diplomacy. But diplomacy and alliance were without avail. About 1200 B.C.¹ the Hittite capital fell and dominance in Asia Minor passed to the races of Europe.

It is not the purpose here to trace this invasion further; merely to record that it was finally halted at the gates of Egypt by the armies of Ramses III (1198-1167 B.C.). But it is important to observe, as the tide rolls back, that a new people has settled on the Palestinian coasts. These are the Philistines of Biblical history, generally believed to have been dislodged Aegeans fleeing the Achaean advance.² In the north, Aramaean tribes rolling in from the desert took possession of Damascus and built a group of powerful city kingdoms. Still farther to the north and west various European peoples amalgamated along the plateau of Asia Minor, whence subsequently they were to emerge as the Phrygians of history.

Possibly, then, it is not coincidence that the earliest references to iron in the Asian-Egyptian texts³ correspond so nearly in time with invasion from Europe; that the clearest and best are a part of, or concerned with, the Hittite record. Far from surprising, this is precisely what might be expected to follow a European origin. Naturally the Hittite kingdom, dominating Asia Minor, would in that case be first of the eastern empires to acquire the knowledge. And though absolute proof of a west to east trend is now lacking for iron, the influence of Europe upon Hittite affairs, generally, can no longer be doubted.⁴

That the use of iron was forced upon Asia by conquering races is also implied in the widespread development of a taboo. This is most evident among peoples who were at great disadvantage in securing the necessary raw materials, or who were so situated otherwise as to be decidedly limited in facilities for working them. Thus an iron taboo is especially strong among the early Hebrews, who not only were without raw material, but cut off on all sides from supplies of the semi-finished product. "Now there was no smith found throughout all the land of Israel; for the Philistines said, lest the Hebrews make them swords or spears."⁵ Clearly the Hebrew taboo, though it frequently assumed a spiritual form,⁶ was at heart economic. Like many another, fundamentally it expresses the despairing resentment of a conquered and helpless people.

But the belief that iron was an intruder in the East rests on more solid foundation than the inferences to be drawn from any taboo. From the upper cataracts of the Nile to the Caucasus and from the Euphrates to the Aegean Sea there are no deposits of iron to compare in quantity or quality with those of Europe. Nowhere in western Asia is there a known occurrence of spathic, the ore best adapted to the groping technique of an original iron metallurgy.⁷

¹ John Garstang, *op. cit.*, p. 10.

² Breasted, *op. cit.*, p. 273.

³ J. A. Knudtzon, *Die El-Amarna Tafeln*, No. 22, Tushrattas to Amenophis III (1411-1375 B.C.); Breasted, *Ancient Records, Egypt*, II, 537, Tribute to Thutmose III (1501-1447 B.C.); III, 403, Power of Ramses II (1292-1225 B.C.); IV, 302, Temple Gifts of Ramses III (1198-1167 B.C.); Luckenbill, *Ancient Records, Assyria and Babylonia*, I, 247; Hunting Expedition, Tiglath-Pileser I (1125-1100 B.C.).

⁴ John Garstang, *op. cit.*, pp. 38, 39.

⁵ Samuel, I, XIII, 19.

⁶ Joshua, VIII, 31.

⁷ Once it had been discovered that spathic ores were reducible, it follows that the iron process would gradually be made applicable to the more difficult hematites and limonites scattered throughout the known world. The resulting iron would, however, lack the consistent quality of that made from the spathic ores. Spathic (Fe CO_3) ore is the representative member of the iron carbonate group and

In Europe the situation was quite the reverse. There, several localities¹ had extensive deposits of manganiferous spathics. That these have been worked from immemorial times is abundantly evident; just how far back is at present uncertain, and of necessity will continue to be so until more is known of the races of Europe and their geographic distribution during the years immediately preceding the Iron Age.

Classical historians speak vaguely of Iberians in the west, Ligurians around the mouth of the Rhone, and Illyrians along the eastern shores of the Adriatic; but whether these were indigenous peoples, or an intruding folk, is not yet clear. It is certain, however, that they, and other European races beyond the vision of history, were workers of metal, and the temptation is strong to credit them with a knowledge of iron. But any such theory, however developed, lacks supporting evidence; and until this may accumulate, the opening of the Iron Age, for both Europe and Asia, can be dated only from the Hallstatt burials.

III

The Hallstatt cemetery lies in a defile of the Noric Alps some thirty miles east and south of the Austrian city of Salzburg. In 1846 and the years immediately following, this cemetery was excavated by Ramsauer. So remarkable was the culture here laid bare that "Hallstatt" has taken rank as a type-name, and is now used to identify other and similar sites such as those uncovered by excavation in the provinces of Styria and Carniola, at Glasinatz in old Bosnia, and Bologna.

Altogether nearly a thousand burials² were opened at Hallstatt, and the wealth of material exposed included objects in gold, amber, glass, bronze and iron.³ Swords, daggers, axes, spear-heads and javelins were found, many of iron, though a few were bronze.⁴ The fact that the iron objects were, in most cases, mere slavish copies of those in bronze, indicates clearly that Hallstatt was a transition-type station whose inhabitants, in the years around 1000 B.C., were passing from the use of bronze to the working of iron.

Who those inhabitants were is not yet clear. The fact that cremation and inhumation were both practiced on this site indicates the presence of two or more races,

when pure contains 48.3% iron. There are minor occurrences in the United States where it is more commonly referred to as siderite. In England, the "blackband" deposits of the Cleveland district are perhaps the best known of all the spathics. The analysis given by Bauerman (cf., Note (1), p. 564, is reasonably typical. It is observed that in calcining nearly all of the ferrous has been converted to ferric oxide and that about 80% of the carbonic acid (CO₂) has been driven off. While the acids and bases (5.58% and 13.48% respectively in the analysis cited) are not balanced, they are more nearly so in the spathics than with other ores. This would be of tremendous value in direct reduction by primitive methods. It is possible too, that porosity develops in driving off the carbonic acid, which would also tend to facilitate reduction. Lime and magnesia are present in sufficient amounts to absorb considerable sulphur. On the authority of Gregory (*The Elements of Economic Geology*, 1927) some of the blackband ironstones found in Scotland contain so much carbonaceous matter that they can be smelted without additional fuel.

¹ Synoptical tables, pages LXXIII to LXXIX, *Iron Ore Resources of the World*, published by the Eleventh International Geological Congress, Stockholm, 1910, list spathic ores as occurring in Europe at the following points: France, Eastern Pyrenees; Spain, Leon; Austria, Styria and Carinthia; Hungary, Szepes-Gomerer in Carpathian Hunyad district; Bosnia, generally distributed; Germany, Siegerland.

² Ridgeway, *op. cit.*, I, p. 411.

³ Joseph Déchelette, *Manuel d'Archéologie*, III, p. 93.

⁴ Ridgeway, *op. cit.*, I, pp. 413-418.

possibly an Illyrian sub-stratum overlaid by Nordic invasion. The cremation burials were by far the richer, which might conceivably lead to a belief that iron was a discovery of the cremationists, were it not for the fact that at Glasinatz the order reverses itself. There inhumation predominates¹ and iron² objects are less numerous, and poorer, in the cremation graves.

But whether Illyrian or the culture of some unknown race, the astonishing fact is that here in the Hallstatt cemetery lay visible evidence of the earliest comprehensive use of iron by man. Nowhere else has such an abundance and variety of iron objects been found with a comparable dating, and it is obvious, of course, that the Hallstatt forms are merely type-representatives of a long evolutionary process. How far anterior to 1000 B.C. the working of iron began in this region is sheer speculation.³ All that can now be said with reasonable assurance is that it could not have been prior to 1500 B.C.; and the probabilities are that it was some two or three centuries subsequent to that date.

Was it here in the Danube valley, then, that the fires of the iron industry were first lighted? Is it probable that a people so young in the metallurgical art could have been first to achieve this momentous advance? Hallstatt and the archaeological evidence point an affirmative answer; but that, taken alone, is not necessarily conclusive.

Of the excellence and abundance of iron ores in the Danube area there can be no doubt. Herein lay the Roman province of Noricum, comprising within its ancient boundaries modern Styria and Carinthia and such famous mediaeval arm-making centers as Innsbruck and Salzburg. Noric iron, long the criterion of excellence,⁴ was indeed familiar alike to metallurgist and poet.⁵ Pliny⁶ rates it as inferior only to iron from the Seres,⁷ or that made by the Parthians.

Modern testimony is equally laudatory. Jars, who visited this region in 1758, called attention to the fact that steel was frequently produced by direct reduction from the manganiferous spathics of the Styrian Erzberg of Eisenerz.⁸ These Eisenerz

¹ *A Guide to Early Iron Age Antiquities, British Museum.*

² Iron objects from the Glasinatz graves include spears, javelins, swords, celts, palstaves and axes. Dagger blades are found in both iron and bronze. Bronze arrow-heads, helmets, greaves, shield-bosses, studs, brooches and pins are also in evidence. Cf., Ridgeway, *op. cit.*, I, pp. 432-438.

³ Ridgeway dates the earliest Hallstatt graves back to 1200 B.C., and places the earliest Glasinatz burials around 1100 B.C. This seemingly is in complete accord with the early Bologna (Benacci 1) which Randall-McIver dates at approximately 1050 B.C.

⁴ Petronius epitomizes the Roman esteem for Noric iron through Trimalchio's praise of his cook: "And because he has a good mind I have brought him from Rome, as a gift, knives of Norican steel." And at once Trimalchio ordered these to be brought in, and after we had inspected them he gazed on them with admiration, and gave us permission to try the point on our cheek." *Satyricon*, 70.

⁵ Ovid, *Metamorphoses*, XIV, 712; Horace, *Epodes*, XVII, 71; *Odes*, I, 16, 9.

⁶ Pliny, *Natural History*, XXXIV, 14, 41.

⁷ "The *Periplus* says that 'Chinese' hides or furs were exported from Barbaricon on the river Indus, and Pliny says that iron made by the 'Chinese' was sent by them with their skins and tissues to Rome. Pliny's reference to 'Chinese' iron, tissues and skins is now taken to refer, in reality, to products not from the Chinese, but from the 'Chera' kingdom of south India, so frequently visited by Greek merchants from the reign of Claudius onwards. Chera is often confused with Seres, or Chinese, because of the soft 'ch' and the appellation Seri given to the Cheras by the Ceylonese." E. H. Warmington, *The Commerce Between the Roman Empire and India*, pp. 37, 137, 158.

⁸ Henry Louis, "Presidential Address," *The Journal of The Iron and Steel Institute*, No. I, 1929.

ores have been more recently discussed by Bauerman¹ who notes that "the production of steel blooms in the open charcoal fire (Rohstahlfeuer) is still carried on in some small mountain forges, but on an extremely restricted scale for special steel making purposes."²

Obviously good ores in sufficient quantity to provide for the needs of a primitive industry were available at, or near, Hallstatt.

The evidence is less absolute for the metallurgic progression of Central European peoples between 2000 and 1500 B.C., yet, in spite of this lack, continuity is discernible and the objections, after all, may be more apparent than real. Perhaps it is merely that the mind, grown accustomed to enormous lapses of time for the unfolding of European cultures, finds it incredible that in less than five hundred years any people could acquire a knowledge of copper and bronze, and achieve the metallurgy of iron. But the second millennium was, for Europe, an age of rebirth. Trade and migration were everywhere increasing, and with the exchange of material possessions came the interchange of ideas. Lying on the main amber routes,³ in touch with the Baltic, the Mediterranean and Aegean worlds, no region in the west was more susceptible to external influence than the Danube area. Here, in the dawn of history, lived young and vigorous peoples constantly under pressure from migratory hordes moving down from the north. Alert, eager, conscious of growing power, they were unfettered by metallurgical tradition, and of necessity exploited the mineral wealth which lay at their hands.

If priority for the West rests chiefly on the evidence of objects, the claim of the Caucasus is an epic tradition without tangible proofs. No iron found in that area can be dated earlier than the Nimrud-Nineveh hoards of the eighth century B.C. Conceivably future discovery may show that the working of iron in the Caucasus is much older than can now be admitted. The possibility of this has already been a subject of much speculation; and de Morgan,⁴ noting certain similarities with Hallstatt forms, has tentatively suggested that Hellenendorf was the parent whence sprang the iron cultures of Central Europe. On the evidence as it stands today it seems more probable that the order of precedence was quite the reverse, and that Hallstatt, far from being the offspring, was the inspiration of Hellenendorf and other Caucasian cultures.

Iron among the Hittites appears to have been rare and only in the Late Period (1200-604 B.C.), following submergence of the central kingdom, does it really begin to supersede bronze.⁵

¹ H. Bauerman, "The Erzberg of Eisenerz," *The Journal of The Iron and Steel Institute*, No. III, 1907.

² H. Bauerman, *Ibid.*, p. 36.

³ *A Guide to Antiquities of the Bronze Age*, British Museum, p. 136.

⁴ J. de Morgan, *Prehistoric Man*, 1925.

⁵ In the Hittite collections of the British Museum an iron lance-head and various types of iron hammers are dated from the late Hittite period (1200-604 B.C.). The collections also include numerous spearpoints and arrow-heads believed to have been used in the battle of Carchemish (604 B.C.) between Necho and Nebuchadnezzar. Post-Hittite objects found at Carchemish include spear-heads, lance-points, knives, picks and daggers.

The frequently cited letter of Hattusil III¹ (1287 B.C.) to Ramses II (1292-1225 B.C.) shows that knowledge of iron had developed to a point where a distinction was made between good and poor quality. That letter does not necessarily imply, however, that the Hittites themselves were makers of iron; and the king's statement, "I have written to get it," may mean either that a request had been sent abroad, or the command given to workers within the realm. It is more likely to have been the former, for with his own subjects such a matter would scarcely take the form of official correspondence; moreover, and contrary to a persistent tradition, it does not appear that especially good ores were to be found within the Hittite domain.

The deposits of Asia Minor are, for the most part, low grade hematite with some occurrence of magnetite.² Certain mines near Tarbali are said to produce both hematites and spathies which, if true, lends considerable significance to Ezekiel's comment³ that the merchants of Tyre received "bright iron" from Javan (Ionia).

Classical references point to only one source⁴ in all this vast region—the land of the Chalybes east of Sinope on the Black Sea. Strabo, writing at the dawn of the Christian era, says that "the Chaldaei of today were in ancient times named the Chalybes."⁵ "Ancient times" is a relative term, and as used by him may be taken to mean some period, more or less remote, of which he had no specific knowledge. In the case of the Chalybes "ancient times" appear to fall somewhere between Homer and Aeschylus, or, between the ninth and fifth centuries B.C.

The Homeric catalogue does not mention the Chalybes, unless, as Strabo suggests,⁶ "Alybe far away," is read, "Chalybe." Even so, the peoples referred to are not known as workers of iron, but come from a land "where is the birthplace of silver."⁶

¹ In the *Mitteilungen der Vorderasiatischen Gesellschaft*, Winckler quotes this letter in full as follows: "Regarding your writing me for pure iron, pure iron is not available in Kizzuwadni in my store-house. I have written to get iron, and they will bring pure iron, but as yet they do not have it on supply. As soon as they get a supply I will send it to you. In the meantime I have sent you an iron sword blade." Hugo Winckler, "Vorderasien im Zweiten Jahrtausend," *Mitteilungen der Vorderasiatischen Gesellschaft*, 1913, p. 61.

² A relatively scanty literature on the iron deposits of Asia Minor contributes but few hints of a helpful historical character. Sources on which the conclusions here arrived at are based, include: *Iron Ore Resources of the World*, published by the Eleventh International Geological Congress, Stockholm, 1910; *The Iron Ore Resources of Europe*, by Max Roesler, U. S. Geological Survey, *Bulletin* No. 706; *Troy*, by Walter Leaf, 1912. An article appearing in the *Iron and Coal Trades Review*, July 22, 1927, Vol. 115, p. 131, has proven especially helpful.

³ Ezekiel, XXVII, 19.

⁴ According to Garstang (*The Hittite Empire*, 1929) there were important iron mines near Sis by the side of the Geuk Su, precisely the location of Muskian Tabal which lay approximately 38 N. 36 E. Of the nature and quality of these ores no trustworthy information is now available, but the implication is that they were workable. In any event, soon after the known appearance of iron in Asia Minor the Tabal area became a center of active hostility until finally, "Assyrian armies advancing against the former frontiers of Hatti found themselves in conflict with a people whom they called the Muski. The suggestion is that the Muski of the Assyrian texts were the Moschi of Herodotus (III, 94; VII, 78) and were really the first of the Phrygian immigrants from Thrace." Recognition of the Muski as the Moschi of Herodotus also suggests that these people may have been the Biblical Meshech, a name usually coupled with Tubal (*Gen. X, 2*; *Ezek. XXVII, 13*; *XXXII, 26*; *XXXVIII, 3*; *XXXIX, 1*). And Tubal, long connected with the Tibareni, a people dwelling near the Black Sea, is more plausibly patronymical if derived from Tabal. Not only is transliteration then seemingly perfect, but Muskian Tabal lay more nearly upon the Hebrew horizon than the little known lands along the Black Sea. Thus Tubal-Cain, "an instructor of every artificer in brass and iron" (*Gen. IV, 22*), would appear as the eponymous hero of the only iron-producing region within reach of the Hebrew state.

⁵ Strabo, XII, 3, 19, 20.

⁶ Homer, *Iliad*, II, 857.

With Aeschylus, however, there is no mistaking the Chalybes as a nation of iron-workers, but with equal clearness the poet locates them north of the Black Sea and west of the Caucasus;¹ and again in *The Seven Against Thebes*, he seemingly supports this contention when he alludes to, "the Chalyb that hath come, a settler here from Scythia."²

On the testimony of Herodotus³ and Strabo,⁴ the Scythians do not appear to have been users of iron until, driven from their home east of the Caspian by the Massagetae, and thrust westward, they came in contact with Cimmerian tribes moving east from Europe across the southern steppe-lands of Russia. The "ruthless Chalyb" thus appears to have been a Cimmerian-Scyth; and chronologically his arrival in Asia Minor can be placed late in the eighth century B.C., immediately before, or contemporary with, that wave of invasion which rocked the Assyrian kingdom and struck down the Phrygian state.

Knowledge of iron among the Chalybes therefore is seemingly traceable to Cimmerian influence, and through them, perhaps, to Central Europe. How they developed their undoubted skill is shrouded in mystery. It is not altogether improbable, that, like the natives of Hyderabad, the Chalybes evolved independently a crucible process; otherwise, it is difficult to comprehend how, as Aristotle asserts,⁵ they could possibly smelt "sand that is carried down by the river."⁶

IV

The second half of the Iron Age begins approximately at 500 B.C. and ends at the opening of the Christian era. Like the earlier or Hallstatt period, the late Iron Age, also taking its name from a representative type-site, is known as La Tène. Pre-

¹ Aeschylus, *Prometheus Bound*, 707-735.

² "A stranger it is that apportioneth their inheritance, the Chalyb that hath come a settler here from Scythia; a ruthless distributor of wealth, even savage-hearted steel, that hath allotted them as land wherein to dwell even so much as may be theirs to hold in death-disportioned of these wide demesnes." Aeschylus, *Seven Against Thebes*, pp. 727-733 (Trans. Herbert Weir Smyth).

³ Herodotus, 1, 215.

⁴ Strabo, XI, 8, 6.

⁵ "It is said that the production of Chalybian and Amisenian iron is very peculiar; for it grows together, as they assert, from the sand that is carried down by the river. Some say that they simply wash this and smelt it in a furnace; but others, that after frequently washing the deposit left by the first washing they burn it and insert what is called the fire-proof stone which is abundant in this country. This iron is far more beautiful than the other kinds; for if it were not burnt in the furnace it would not differ at all, as it appears, from silver. Now they say that it alone is not liable to rust; but that it is not very plentiful." Aristotle, *De Mirabilibus Auscultationibus*, Ch. 48 (Trans. Launcelot D. Dowdall).

⁶ A series of preliminary experiments made by the author with black river sands, collected from various arroyas in southern Arizona, show that repeated washings are necessary to remove objectionable amounts of silica sand and gangue. This carefully done, a fine crystalline ore may be obtained with free iron running between sixty and eighty per cent. The ore particles after washing are so fine, however, that smelting in an open fired furnace could never be carried out, no matter how carefully the drafts were controlled; hence the deduction that if the Chalybes smelted river sand, as Aristotle asserts, they must have evolved some form of crucible process. But melting carefully done in sealed crucibles with the addition of coal, or other carbonaceous material, would yield steel of varying hardness at will of the operator. It is suggested that possibly herein lies a solution of the traditional mystery of the excellence of Chalybian iron. The fact that most iron sands carry upward of one per cent titanium would not be an obstacle to the primitive metallurgist; and the relatively low phosphorus and sulphur would more than compensate for any harmful effects from the presence of titanium in small amounts. A typical analysis of the Arizona river sands experimented with, is as follows: Phosphorus, .075%; Sulphur, .08; Silicon, 1.97; Titanium, .90; Iron, 66.99; Non-metallics, by diff., 29.985.

cisely defined, La Tène is a Gallo-Keltic culture; hence a late Iron Age is recognizable only in Europe north of the Alps. It is contemporary with Republican Rome and overlaps the high civilization of Greece, Persia and Macedonia.

The La Tène settlement lay on a bay at the eastern end of Lake Neuchâtel, and the site was, for the first time, fully revealed when the water-level receded about fifty years ago.¹ The almost complete absence of articles connected with domestic life² indicates clearly enough that it was a military post, probably occupied by Helvetians³ during the third and second centuries B.C. Thus the civilization at La Tène itself falls within the middle period of the late Iron Age in Europe.

The richest burials of the earlier period (La Tène I, 500–300 B.C.) occur in the upper Rhine valley in the vicinity of Coblenz, and in the Champagne district of northeast France.⁴ During the middle period (La Tène II, 300–100 B.C.) the Keltic area, comprising parts of France, Germany, Austria and Hungary, was a broad belt stretching across central Europe from the Atlantic to the Carpathians, and lying approximately between the 47th and 50th parallels of north latitude. At its greatest extent projecting points of dominion also appear in Britain,⁵ Spain, north Italy, Dalmatia, the Balkans and Asia Minor. In the late period (La Tène III, 100–1 B.C.) the Keltic sphere of influence abruptly contracts. Rome, determined to safeguard her frontiers,⁶ had then advanced beyond the Alps, and the legions of Caesar complete the subjugation of Gaul. At the same time the Teutonic tribes, which in La Tène I were east of the Elbe, had passed the Rhine and were pressing southward. Caught, pincer-like, between the disciplined forces of Rome and the undisciplined, but equally implacable Teutons, Gallo-Keltic civilization was squeezed out and ultimately vanishes from European history.

Where or when the first Keltic movement took place has not yet been determined,⁷ but early in the seventh century these warriors appear in the upper Rhine valley. Possibly the late Hallstatt (700–500 B.C.) culture can be traced to their influence; in any event, it was this mobile and conquering race that, in the years between 500 and 100 B.C., spread a knowledge of iron over northern and western Europe.

The growth and extent of this Keltic iron-working is revealed by the numerous exposed sites scattered throughout central Europe. At Gyula in Transylvania the remains of a furnace have been found.⁸ Two of the earliest and best known sites lie within easy reach of Hallstatt—the one in Carinthia on the upper waters of the Drave, the other in Styria on the Mur.⁹ Both localities, it is to be observed, are

¹ *A Guide to Early Iron Age Antiquities, British Museum.*

² *Op. cit.*, p. 47.

³ Sir William Ridgeway, *The Early Age of Greece*, I, p. 410.

⁴ As has been pointed out by several authorities, the upper Rhine burials are relatively poor in iron, though rich in pottery and other Greek ware of the fifth century. Burials in the Champagne area, however, have yielded not only a considerable amount but a wide variety of iron weapons and implements, swords, spear-heads, shield-bosses, razors, twisted link-chain sword-belts, brooches; bridle-bits, pole-fittings, wheel-tires, are other items common to the chariot-burials and warrior graves found in the Department of the Marne.

⁵ Déchelette establishes a La Tène IV period for Britain, dating it in the first century A.D. Obviously this is drawing the line very fine between Roman and Keltic influence on first century cultures in Britain.

⁶ *A Guide to Early Iron Age Antiquities, British Museum*, p. 79.

⁷ *Op. cit.*, p. 7.

⁸ Ridgeway, *op. cit.*, I, p. 606.

⁹ James M. Swank, *The Manufacture of Iron in All Ages*, p. 76.

within the borders of what later became the Roman province of Noricum. But of greater significance to the antiquary is the wealth of evidence uncovered in the Bernese Jura. Here within a limited area the complete cycle of early iron production—mining, refining and fabricating—has come into view. Not only that, but it has also been possible to date a large number of these various sites with reasonable accuracy by the tools and implements found with the remains.¹ There is little doubt that the iron products of Jura travelled far; and it is more than probable that a great deal of the iron from La Tène itself originated in this region.

Obviously there must have been a wide variation in the quality of iron produced; and in those localities where good ores were rarely obtainable Keltic iron was unquestionably a very inferior product. Polybius, in his account of the wars with the Cisalpine Gauls, unmistakably points to a superiority of Roman over Keltic iron in the third century B.C.² On the other hand, those tribes who most stubbornly contested Caesar's conquest of Gaul—the Aquitani, Bituriges, Sequani, Helvetii and Boii—were, one and all, located at, or near, the best iron ores of western Europe.³

The temptation here is strong to ascribe the more determined resistance of these Gallo-Keltic tribes to better iron weapons—a speculation that borders upon conviction when it is also observed that the “most courageous” of all the Germans, the Belgae, dwelt near the spathic deposits along the Sieg, and that the “most war-like” Suebi occupied Noricum. In later times, the Siegerland was the home of those Germanic Cherusci who destroyed the legions of Varus; there, too, lived the Chatti of whom Tacitus said, “their whole strength lies in their infantry whom they load with iron tools and baggage; other Germans may be seen going to battle, but the Chatti go to war.”⁴

Great as it undoubtedly was, Keltic iron-working had little effect on civilization south of the Alps or east of the Bosphorus. In this respect the late Iron Age (La Tène) is less vital than the early (Hallstatt) period, traces of which long survived in the ancient East. But to the growth of Teutonic power, Keltic La Tène contributed much.⁵ How much, it is difficult even to approximate, for when the record at last becomes clear, Teutonic industry has been partially Romanized.

Greece, even at the zenith of glory and power, was never outstanding as a producer of iron. She did acquire, it is true, a considerable facility in working it, but the best, and by far the greater proportion of her iron was imported in semi-finished condition. Sparta is perhaps the single exception. The mines of Laconia⁶ were apparently adequate for her slender needs, for, though iron was used in every conceivable product, the amount required was relatively small.

¹ Ridgeway, *op. cit.*, I, p. 604.

² Polybius, II, 33.

³ Ebert, commenting on the Keltic finds at Steinsburg, says that, “Work tools in which special hardness is required, such as, knives, files, axes and picks were made of hardened steel; while for other implements (scythes, plough-shares, pokers) softer iron was used.” Cf., “Eisen,” *Reallexikon der Vorgeschichte*, Vol. III, Section 2.

⁴ Tacitus, *Germania*, 30.

⁵ *A Guide to Early Iron Age Antiquities*, British Museum, p. 79.

⁶ “There was not much iron in the soil of Greece. The ancient authors speak of it, or traces of workings have been found, on the peninsula of Taenaron in Laconia, in Boeotia, in Euboea, and in several islands of the Aegean—Andros, Syros, Seriphos and Skyros. According to the legends the Greeks obtained iron and learned how to work and use it from various peoples of Asia Minor, especially the Phrygians and Chalybes.” Jules Toutain, *The Economic Life of the Ancient World*, p. 51.

The Greeks of the epics, while acquainted with iron, are seemingly without knowledge of mining or production methods. There is no hint of such knowledge, at least, among the forty-eight references in the *Iliad* and *Odyssey*. And curiously enough the arrow of Pandarus¹ and the mace of Areithous² are the only weapons of iron in the Homeric legend.³ It is quite clear, in fact, that the Greeks of Homer regarded iron as a semi-precious metal⁴ to be used sparingly for implements; occasionally, perhaps, as utensil-currency.⁵

In Homeric Greece every community had its forge, which was, indeed, the only workshop. Thither came the artisans and landowners for the ever necessary tools and implements. Many brought with them unworked lumps of iron, bronze or copper which the forge-master (*chalkeus*) fabricated to order. Not infrequently the working of iron was a part of domestic industry on the larger estates;⁶ or, if the job was too complicated, the *chalkeus* would be sent for to do his work on the premises. In such cases the metal was always furnished by the proprietor from his "treasury." The equipment and tools of the forge-master were of the simplest kind—anvil, tongs, hammer and hand-bellows. The fuel was usually charcoal. Unquestionably, through long experience, the *chalkeus* learned that certain heating conditions tended to harden (carburize) the iron, and that further hardening was possible by a water quench.⁷ But the subsequent refining and toughening by reheating was beyond the early Greek iron-workers, as they lacked the proper facilities to determine, or control, temperature.

One hundred years after Homer, or late in the eighth century, Hesiod reveals a considerable knowledge of metallurgy; and he skilfully differentiates between the melting of tin by a crucible process and the "softening" of iron in "glowing mountain fires."⁸ But, by then, knowledge of iron had become universal. It was the age of Sargon and the hoards at Nineveh. And while Hesiod was lamenting in lofty Greek verse the approach of an iron age,⁹ even then, the Chalybes were settling on the Black Sea coasts and late Hallstatt Europe was preparing the way for Keltic La Tène.

It was the needs of her colonies which ultimately industrialized Greece. Ionia, whose merchants and traders had long navigated the Aegean and the more treacherous waters of the Black Sea, felt the impetus first. Through such ports as Phasis and Trapezus the products of central and western Asia—skins, furs, gold, and foodstuffs—flowed down on the islands. Copper came from Cyprus; iron from Sinope; tin from the west; fabrics, spices and perfumes from Phoenicia and the Egyptian coasts. With raw materials in abundance, with ever expanding markets for the finished products—craftsmanship developed and industrialization began.

Metallurgy, concentrated first at Miletus, Ephesus, Samos, passed to Euboean Chalcis, and early in the seventh century was a highly developed craft on the mainland

¹ Homer, *Iliad*, IV, 123.

² *Ibid.*, VII, 141.

³ This in itself carries an implication that the Dorians rather than the Achaeans brought iron into Greece, for it is inconceivable that the Achaean conquerors would have abandoned iron for the Mycenaean bronze. The Dorian Spartans, on the other hand, were consistently workers and users of iron from first to last. ⁴ Homer, *Iliad*, VI, 48; XI, 133. ⁵ *Ibid.*, XXIII, 830. ⁶ *Ibid.*, XXIII, 834.

⁷ Homer, *Odyssey*, IX, 392. ⁸ Hesiod, *Theogony*, 862-866. ⁹ Hesiod, *Works and Days*, 176-200.

at such centers as Corinth, Sicyon, Aegina and Athens.¹ From the mother cities, metal-working spread to the colonies; the metallurgists of Magna Graecia in their turn becoming the instructors of Etruria and Rome. By the end of the seventh century the simpler Homeric methods of hammering and casting had been superseded by a more developed technique. Glaukos the Chian had then invented the welding of iron, and the Samians had discovered, or borrowed, a process of hollow-bronze casting.¹ Both inventions, especially the welding of iron, immeasurably advanced the use of metals. It was shortly thereafter that the iron deposits of Euboea and Boeotia began to be worked.

In the Athens of Pericles iron-working was carried on chiefly by resident aliens.² They were the smiths, the manufacturers of tools, implements and weapons. Two of the largest workshops ever known in Greece were the armor factories of the aliens Kephalos and Pasion. Sophocles' father was a blacksmith, and the patrimony of Demosthenes included a sword factory.¹

Until about 330 B.C. prices for iron ore appear to have fluctuated between \$1.25 and \$1.50 (silver) per hundred pounds.¹ Then a boom, due partly to the speculative opportunities created by the wars of Alexander, quadrupled the price. For in Greece of the fourth and third centuries speculation frequently upset supply and demand, and the "corners" in oil, manipulated by the astronomer Thales, were imitated many times with metals and other commodities. It is on record that a Sicilian banker of the fourth century, having bought up all of the available and anticipated output of iron, once cleared a profit of over two hundred per cent.

Early in the second millennium Bronze Age invaders from beyond the Alps swarmed down upon and seized the fertile plains of north Italy. A few centuries later other invaders, seemingly a kindred people, have crossed the Po and are taking up land as far south as the Tiber. Primarily agriculturists, these Villanovan newcomers are now credited with the introduction of iron into Italy. And it was a southern branch of this race, the so-called Italici, to whom is attributed the founding of Rome.

The best known and most carefully studied evidence of this civilization has been collected in the Bologna district.³ There iron was in daily use not later than 900 B.C. Not only has it been possible to trace here the gradual transition from bronze to iron, but Villanova also reveals many features characteristic of Hallstatt—analogs striking enough at least to warrant belief that both cultures developed from a common stem.

¹ Gustave Glotz, *Ancient Greece at Work*, 1926, pp. 128, 132, 205, 307.

² An excellent technical study of Periclean iron has recently been made by William Campbell and Ernest E. Thum (Cl., "Ancient Greek Iron," *Metal Progress*, Nov. 1931). Two "bonding clamps," found by Prof. W. B. Dinsmoor on the Acropolis, were examined microscopically and, while their architectural purpose did not require a quality product, they were not only poorly made iron, but inconsistently poor. Structurally, one of the clamps "resembled ordinary wrought iron," while the other, due to a carbon content ranging from .10% to .90%, might more properly be classified as steel. This report tends to confirm a reasoned belief that only the most skilful operators could control the pick-up, or loss, of carbon through repeated heating in a charcoal fire. It is quite probable, in fact, that the carbon content in many of the earlier specimens was purely fortuitous rather than the result of deliberate intent.

³ A complete and carefully compiled record of this evidence has been published by D. Randall-MacIver, *Villanovans and Early Etruscans*, 1924.

It cannot be claimed that Villanovan civilization itself directly influenced Rome, but indirectly, in its Etruscanized form, it created that city. For those Tyrrhenian immigrants who landed on the Italian coasts in the eighth century mixed with the autochthonous Villanovan stock and became the Etruscans of history.¹ There is nothing to indicate that these immigrants from the East brought a knowledge of iron with them, but there is evidence for a belief that long before they arrived the Villanovan populations had worked the iron deposits of Tuscany and possibly those of the Island of Elba.² Iron-working thus acquired was a developed Etruscan industry by 700 B.C.³

One hundred years later Etruscan armies overwhelmed Rome, and all of Campania and Latium became subject to the Etruscan kings. In a century of dominance which followed (616-510 B.C.) Roman civilization began to take form. Rude farm villages, rapidly expanding to cities, became thriving centers of trade where Greek, Punic and Massiliot merchants bartered their wares and "Corinthian artists and craftsmen found employment in the adornment of temples, palaces and tombs."⁴ Roman metallurgy, and the working of iron, unquestionably date from this period,⁵ when, in addition to the then available mineral resources of Etruria, traders were bringing in tin from Britain and iron from Spain and Gaul.

The expulsion by Rome of her Etruscan kings was seemingly followed by a general migration of the commercial and industrial classes; in any event, Republican Rome turned again to the soil, and for nearly two hundred years communication and trade with the outside world are greatly diminished.⁶ But the lessons learned in the regal period were never forgotten, and, though Roman statecraft from first to last was chiefly political, it never again was entirely blind to economic-industrial factors.

If, as many historians claim, it was land-hunger and density of population which forced Rome, in the fourth century, to attempt the subjugation of all Italy, it is not inconceivable that the first steps taken were part of a deliberate plan. It is significant of this that without adequate mineral resources of her own,⁷ Rome struck first at Etruria, the richest region of Italy in deposits of iron. From then (351 B.C.) until the end of the Second Punic War (201 B.C.) the mines of Elba and the celebrated Etruscan metallurgical centers, Populonia and Volterra, were the chief arsenals of the Republic.

With an abundance of iron assured and with unlimited man-power to draw upon, it was a relatively simple task for the strong centralized government of Republican Rome to build up that irresistible army which, in the space of a hundred years, conquered Italy and forced Carthage to relinquish Sicily. In the century of conflict which followed (241-146 B.C.) Carthage was destroyed;⁸ Spain, Illyria and Greece became subject provinces; and Rome ruled supreme in the western world.

¹ Tenney Frank, *An Economic History of Rome*, 1927, p. 16.

² Jules Toutain, *The Economic Life of the Ancient World*, 1930, p. 208.

³ Paul-Louis, *Ancient Rome at Work*, 1927, p. 66.

⁴ Frank, *op. cit.*, p. 23.

⁵ "The eight guilds of the seventh century were those of the flute-players, gold-smelters, smiths, dyers, cord-wainers, curriers, brass-workers and potters. It has been remarked that the workers in iron did not at that time form a group, which proves that iron-working was still either unknown in Rome, or in any case rarely practiced." Paul-Louis, *op. cit.*, p. 48.

⁶ Frank, *op. cit.*, p. 67.

⁷ Paul-Louis, *op. cit.*, p. 68.

⁸ Cf., Jules Toutain, *op. cit.*, p. 193.

It must not be inferred that with the acquisition of the iron of Elba Rome abandoned the use of copper and bronze. On the contrary, iron never replaced those non-ferrous metals for household utensils, implements of the simpler forms, and for articles of adornment or general utility. But from the fourth century onward, cutting tools, farm implements,¹ and the like, are usually of iron, as are the swords, daggers, spear-points and arrow-heads used by the army.² Defensive armor, on the other hand—helmets, breast plates, mail, greaves—were usually of bronze; a fact readily accounted for by the many technical difficulties involved in hammering iron blooms into thin pieces or shapes.

Until the closing years of the Republic, Roman iron-working was Homeric in its rudimentary simplicity. Every community had its local forge, as in Greece of that earlier period. There is the same tendency, too, among the wealthy landowners to employ freedmen or slaves skilled in the working of iron. Varro, a contemporary of Caesar, tells, in *De Re Rustica* (1, 16, 4), of travelling smiths who, in his day, went from farm to farm doing whatever iron work might be required.

Nothing better illustrates the primitive character of the iron industry in Republican Rome than those surviving monuments which depict the community forge with its meagre equipment, and the racks of cutlery and tools along the wall ready for sale direct to the householder, farmer or artisan.³ Naturally, in the larger communities, specialization developed with increasing demand; at Puteoli, for example, the iron industry of the first century is represented by sword-makers, sickle-makers, cutlery-makers, each more or less a specialist in his own particular line.

In many respects, however, the iron industry of early Rome differed materially from that of the Homeric Greek world. From its very inception there seems to have been superficial knowledge, at least, of mining and of the refining of ores. Then, too, an almost continuous warfare necessitated huge standing armies, hence a considerable part of Rome's iron-workers were always afield with the legions.⁴

Presumably it was military necessity which in the second century B.C. led to a concentration of iron-working at such points as Puteoli, Syracuse, Rhegium, Sulmo and Venafrum, in addition to those older, and then thriving centers of Populonia, Volterra and Minturnae. The way was thus paved for government participation in the last years of the Republic and ultimately for state control and operation of arsenals under the Empire.

It was in the first half of the Empire that the mineral resources of Europe were really exploited to meet the growing demands of a Roman world. Iron, which under the Republic had been supplied chiefly by the mines of Elba and those of Spain, in the days of Hadrian (117–138 A.D.) was coming also from Gaul, Britain, Noricum, Illyria and Thrace. Not that much of the iron produced in those regions actually appeared on the market at Rome; that output, indeed, was almost wholly absorbed

¹ Iron farm implements from the late Republic or early Empire have been found in the ruins of the buried villa of P. Fannius Sinistor near Boscoreale (Pompeii). Some of these are in the collection of the Field Museum of Natural History at Chicago; others in the Museum of Naples. Excellent reproductions of the Field Museum collection are shown on Plate X of M. Rostovtzeff's, *Social and Economic History of the Roman Empire*.

² Polybius, VI, 23.

³ Such a shop is represented upon a tombstone in the Vatican Gallery. Frank, *Economic History of Rome*, p. 235.

⁴ Frank, *op. cit.*, p. 235.

by the enormous arms factories long since established at strategic points near the various mines. Thus Noricum, which produced the best iron of the Roman world, served principally the many state arsenals on the Danubian frontier.¹ Nor was the iron used by Imperial Rome altogether the product of its own mines and forges. Swords and cutting tools, possibly the only true steel ever used by the Romans, were imported in quantity from India and Parthia.²

That Roman iron-making did not progress greatly beyond broadening the field of industrial application is due largely to the abundance of cheap labor and a traditional contempt of the ruling classes for industry in general.³ Man-power, capital, and a directing intelligence capable of technical advance far beyond the inherited primitive methods were always available in the Roman state. But labor alone could not be expected to supply the necessary initiative; capital, otherwise actively engaged or indifferent, would not; and the task of revolutionizing the iron industry passed to Europe of the late Middle Ages.⁴

V

It can no longer be doubted that primitive man used meteoric iron. And that its use was continued until historical times is amply attested by the earliest objects, some of which are known now to have been made from the celestial metal.⁵ This by no means implies utilization, or even the presence, of any considerable quantity. Less than three hundred tons the world over is known to science today, most of which has been found on the American continent.⁶ Unaccounted for yet by natural law, this preponderance in the west is frequently cited as proof that primitive races in Europe and Asia must have utilized equal, perhaps larger, amounts. Such speculation is apt to ignore that its premise also connotes meteoric iron as scarce in those areas. The probabilities are that it not only was rare but that its bulk was untouched in primitive times.⁷ Only detachable protuberances⁸ from some of the larger

¹ Toutain, *op. cit.*, p. 254.

² E. H. Warmington, *The Commerce Between the Roman Empire and India*, 1928, p. 258.

³ Frank, *op. cit.*, p. 274.

⁴ The earliest known blast furnace and the beginning of the modern fusion process in Europe date from about 1340 A.D.

⁵ The pre-dynastic beads of El Gerzeh and the dagger of Ur are reported to show by analysis a nickel content in excess of 7.00 per cent, and therefore presumably are meteoric iron. A meteoric origin has also been claimed for the cube of Knossos, the rings of Vaphio and Kakovatos, and the dagger of Tut-ankh-amen, but laboratory confirmation of this appears to be lacking. The Abydos lump, owing to oxidation is at best doubtful evidence. Even the much discussed fragment from the Great Pyramid, though still in dispute, is probably meteoric iron. Cf., C. H. Desch, *The Journal of the Iron and Steel Institute*, No. II, 1929, p. 343; T. A. Rickard, *The Journal of the Iron and Steel Institute*, No. II, 1929; *A Guide to Antiquities of the Bronze Age*, British Museum.

⁶ G. F. Zimmer, "The Use of Meteoric Iron by Primitive Man," *The Journal of the Iron and Steel Institute*, No. II, 1916.

⁷ "We thus see that the cosmic sources of meteoric iron available (if we judge from the present day knowledge of similar masses) to primitive man were:

- (a) Projecting portions of the larger masses;
- (b) Siderites of a friable crystalline structure;
- (c) Ramified iron or the nodules of siderolites;
- (d) Complete meteoric individuals of eleven pounds, and under, in weight.

⁸ The Descubridora meteorite, or rather that portion of it now in the Vienna Museum, reveals one

siderite masses and small, but complete, individuals could be cold-worked. Seldom, indeed, would a malleable fragment be found large enough to shape into weapon or implement; hence utilization, as the evidence shows, must have been chiefly confined to such objects as amulets, beads, rings and images.¹ Telluric (native) iron is even less likely to have been a contributing factor. Rarely found now,² it is highly

It is impossible to form any idea as to the quantity to be obtained under (a) and (b);

	Total Weight	Average Weight
For (c) possibly	22,000 lbs.	.....
For (d) 60 masses	315 lbs.	5.25 lbs.
219 "	296 lbs.	1.35 lbs.
2,000 "	2,200 lbs.	1.10 lbs."

G. F. Zimmer, *op. cit.*, p. 341.

of the failures in an attempt to obtain meteoric iron with primitive tools. Wedged in a groove, obviously cut for the purpose of detaching a fragment, is the broken end of a copper chisel.

¹ An experiment by the author, though by no means conclusive, does indicate some of the difficulties probably encountered by primitive man in his attempts to work meteoric iron. The experiments were carried out with approximately one pound (11 small pieces) from the San Angelo, a medium octahedrite, the analysis of which as given by O. C. Farrington, *The Catalogue of the Meteorites of North America*, is as follows:

Iron	91.96%	Silicon	.011%
Nickel	7.86	Phosphorus	.099
Carbon	.....	Sulphur	.032
Manganese	.....	Cobalt	....
		Copper	.04

All of the pieces were etched and showed a typical Widmannstatten structure. Hardness was approximately 250 Brinell. In the experiment ten of the eleven pieces were melted, and one piece was subjected to a crude attempt at hot forging.

Melting: Charged 314 grams in a small magnesite crucible and melted in an Ajax high-frequency induction furnace operated by an oscillator. After cooling the melt was knocked out of the crucible where it had solidified in the form of a bar 1" dia., $2\frac{1}{2}$ " long. Loss in weight due to melting was 29 grams. Examination revealed a pipe cavity extending to a depth of about one half the total length of the piece. Polished and examined at 150 magnifications specimen showed large areas of oxide inclusions surrounding the pipe cavity. Etched in 5% nitric solution, dendritic crystals were visible at 65 magnifications scattered irregularly throughout the field. Comments by J. W. Percy on the micro-photographs taken are as follows:

"Again we are sending you a rather belated reply to your letter of July 25th, in relation to the micrograph of the melted meteoric iron. I am inclined to agree with you that the sample after remelting seems to be more typically meteoric than the micrograph which we took shows. However, I am not exactly inclined to agree that the condition is a Widmannstatten structure. I will agree, however, that it certainly shows axial crystallization. Crystallization roughly appears to be at approximately 60° and not cubic which would be the case with pure iron. I do note, also, the total absence of the two constituents which are supposedly typical of meteoric iron. These are quite evident in the micrograph which we sent which showed the exceedingly large and small grains. It seems the remelting has destroyed or dissolved these two constituents."

Forging: Heated one piece, weighing 66 grams, to medium cherry red (1250° F.). Structure not obliterated at this temperature, and on etching in 50% hydro-chloric solution Widmannstatten marking was as distinct as in original specimen. Reheated to light cherry (1550° F.), to salmon (1650° F.) and forged on anvil with ball pein hammer. The piece, while ductile and yielding under the hammer blows, showed tendency to open up along the boundaries of the kamacite plates. Specimen without going cold was reheated to welding heat (white, 2200° F.), but could not weld or flow into solid piece because of cracking along the cleavage planes; due, in all probability, to the formation of films of rust at these points.

Conclusion: It is perhaps reasonable to conclude, if conclusions are possible from a single experiment, that most of the hexahedrites and many of the medium octahedrites were beyond the simple technique of primitive men.

² "The specimens of telluric iron in our own national collection (if we except the dubious finds on the west coast of Greenland) can be held in the hollow of one hand; there might be enough for a few beads, but not for larger objects." G. F. Zimmer, *op. cit.*, p. 307.

improbable that it was available in quantity when man began to use metals. Judged solely from their metallurgic-geological aspects both meteoric and terrestrial iron were beyond the simple technique of early primitive man.

Native copper presented a less complex problem. It was certainly common, if not abundant, and could be readily mined with the simplest of tools. To a chalcolithic artisan copper would seem surprisingly plastic and the first forms, though crudely cold-worked, a tremendous improvement over similar objects in flint or stone. With experience, moreover, it would soon become known that malleability increases when copper is heated; this leading in turn to diversification and, ultimately, to the knowledge that copper would melt.¹

The first copper smelting furnaces were unquestionably shallow holes or trenches, perhaps two feet wide and deep, lined with refractory clay. Hand fanning or blow-pipes would be employed to raise the temperature. It is entirely reasonable to assume that attempts to melt iron would be made in these furnaces. Such attempts were, however, foredoomed to failure for the simple reason that even if the temperature could be raised to 2768° F., it could not be maintained at that point long enough to melt the iron. In other words, these units were far too small to develop heat in the required volume. Something akin to the semi-fused product of a later antiquity might be achieved, but pound for pound as compared with copper the yield in iron would be less than one fourth² and the fuel consumed at least twice as much. Except in some cases of rare necessity this was probably more than the "traffic" would bear.

Such are conceivable aspects in the primitive background when the working of metal first comes within the vision of history in Sumer, Egypt and Crete. It is not to be wondered that little iron had been used. And with the introduction of crucibles and invention of moulds in the third millennium³ the adequacy of cast copper did not escape those alert civilizations then clustered around the eastern Mediterranean basin.

Here larger objects and a greater variety reflect the steady advance of non-ferrous metallurgy in the next thousand years. Skill, grown inventive,⁴ is itself re-

¹ It is improbable that the copper sulphides, oxides and carbonates were successfully reduced in this epoch. To admit that is to imply a knowledge of metallurgy capable of alloying tin and copper in the proper proportion to make serviceable bronze.

² This is, of course, an arbitrary figure based on a concept of the probable working conditions. It is not so simple, as many modern writers seem to believe, to reduce iron in a shallow hole either with or without an artificial blast. A series of ten unsuccessful attempts has convinced the author, at least, that this is a fact. In only two of the ten was there evidence of reduction and the process appeared incomplete in the one, while the other was over-carburized. Lack of success now does not mean that it cannot be done. But would that conviction be equally strong where there had been no prior experience? The answer is undoubtedly—no. As an original quest, repeated failure with low grade ores would at some point call a halt and the primitive interest would only rekindle as actual evidence appeared that other peoples had been more successful. Such tangible evidence would be most likely to come from those areas where good ores were found.

³ While no precise dating is possible, the evidence, as a whole, tends to support the citation. Broken crucibles have been found associated with third millennium remains, but none that are assignable to an earlier period. Universality also is indicated by the fact that crucibles occur, not only in the Mediterranean area, but east to the Urals and as far north as Britain. Necessarily, the invention of moulds would follow, rather than precede, the introduction of crucibles.

⁴ The inventions of this period, which in no small measure account for the increase in size, include riveting and hollow casting. The hardening of copper by cold hammering may also be assigned to this period.

created in the changing image of its own technique. Then, without perceptible break, eastern supremacy wanes, and late in the second millennium pre-eminence in metals passes to Central Europe.

Whether the working of metal was indigenous or an intruding culture in Europe may never be known. In Spain and along the coasts the accumulating evidence suggests Oriental influence. But in the Danube valley and on the Rhine a distinctive metallurgy appears, stimulated, no doubt, by the available supplies of good ore and the abundance of timber for fuel. In the last analysis it is raw material supply which accounts for the metallurgical ascendancy of Europe, and the appearance there rather than in Asia of huge battle-axes, formidable leaf-shaped swords, and finally the enormous bronze and iron weapons of an eleventh century Hallstatt cemetery. Who these Hallstattians were and whence came their knowledge of iron is not known. One thing is certain; skill such as theirs was never attained in a single century.

Nor is it yet possible to determine precisely the form of furnace employed, for of the many prehistoric iron-works found none can with safety be assigned to this period.¹ It is possible, however, by working backward from types known to have been used by the Kelts to arrive at a reasonably accurate conception.²

Like its copper-smelting prototype, the Hallstatt furnace would be a shallow excavation, about two feet square and deep, lined with refractory clay. But where this excavation had formerly comprised the entire unit it was now merely the hearth; the melting chamber proper rose above ground to a height of two or three feet. Its inner wall, banked with sod, was enclosed by a rough stone facing. Possibly twelve inches square at the top, this chamber gradually widened to twice that dimension at the hearth, into which a free flowing stream of air was admitted through an opening pointed into the wind.

Furnaces of this type might conceivably produce in eight or ten hours a semi-fused mass weighing fifty pounds. In this operation alone approximately two hundred pounds of charcoal would have been consumed, while subsequent heating and working required at least one fourth as much more.

¹ The Tarxdorf furnaces referred to by Ebert (*cf. op. cit.*, sect. 2) are probably of a later period. From his description of the accessory remains it is quite possible, in fact, that these were calcining rather than reducing furnaces. In any event, it is certain that iron was never "smelted" in these small units.

² The reconstruction as here presented is predicated on an article appearing in *Stahl und Eisen*, 49, No. 15, April 11, 1929: "Evolution of the High Furnace in Styria," a part of which follows:

"With the early method a forgeable iron was obtained from impurity free ores by direct reduction. As long as only a natural draft was used, these fires were deep pits, on steep slopes, provided at the bottom with a draft channel. Later on, square or cylindrical shafts were built, about one meter high and wide, which were provided with bellows operated by hand or foot.

"Figure 1 shows a furnace dating from pre-Roman occupation in the Jura Mountains.

"It had a so-called obliquity to the extent of one half the diameter of the throat so that the coal and ore could go down at the hearth and that the air—only natural draft was used—could circulate freely.

"The oven was first filled with charcoal and quantities of ore broken to nut size. The charge for these furnaces was about four tenths of a cubic meter which produced 150 to 200 kilograms of metallic iron with 430 to 480 kilograms of charcoal.

"In the operation of these furnaces two or three men were sufficient, the fire usually being kept up only 8 to 12 hours. After each melt it was necessary to completely rebuild the furnace."

From the fact that the known prehistoric blooms average less than twenty-five pounds each in weight the estimated yield, as used in the article quoted above, is unquestionably high. For the distribution and a description of prehistorics, bloom *cf.* Max Ebert, "Eisen," *Reallexikon der Vorgeschichte*, Vol. III, Section 2.

Elemental as it appears now, this operation presupposes a technique developed through long experience. Even at best the results were always uncertain. Excess carburization on the one hand, an incomplete reduction on the other, would repeatedly frustrate the unwary or baffle the unskilled. Nor were the difficulties of these early metal-workers at an end with reduction successfully achieved. The iron mass as it came from the furnace was impregnated with slag most of which had to be eliminated before the product was forgeable.¹ With crude equipment, tongs, anvils and hammers, this in itself was no inconsiderable problem. Immediately the reduction process had been judged complete, and the furnace had sufficiently cooled, the front wall would be broken down and the slag-iron mass removed. Some of the cinder and dirt might be loosened by cold-hammering, but the greater proportion, being intimately mixed with the iron, was laboriously squeezed out by repeated heating and hammering. After this, and again with many reheatings, the bloom would be drawn into bars of suitable size and shape to produce the object desired. Starting perhaps with an ore charge of three hundred pounds, the successful operator would have produced at the end of his arduous task about twenty-five pounds of reasonably good iron for forging into weapons or implements.²

Such may have been the method employed at Hallstatt, whereby iron-working took rank as a basic industry. And it was this, or a process akin, that the Dorian invasions carried to Greece and which in north Italy reached Villanova (1000 B.C.). Of more enduring significance is the propagation and spread of the process by the conquering Kelts (700-100 B.C.) from whom, in an Etruscanized form, it descended to Rome. And as lip-fires, so-called, Roman type furnaces survived until the end of the eighteenth century A.D., when they gradually gave way to the more economical puddling process invented by Henry Cort.

Possibly a Keltic iron-master would have failed to detect the slightest resemblance between his crude furnace and a European lip-fire, but in spite of the improvements of two thousand years iron was still made direct from the ore at temperatures considerably below the melting point.³ Nothing had been learned of furnace reactions, and the chemistry of the process was as vague to the European of 1700 A.D. as it was incomprehensible to his Keltic predecessor. Of the elements usually in combination with iron neither had knowledge of any except sulphur. Both comprehended, without knowing why, the necessity for oxygen, and, in lesser degree, the resulting effects from the presence of carbon.

¹ "Iron oxide when reduced at temperatures below 900° C. (1652° F.) forms a dark gray substance, very porous, but otherwise in almost the same form as the original particles of ore. If the final temperature ranges from 1000 to 1050° C. (1832 to 1922° F.) the product is partly sintered to a loosely coherent mass still showing the outlines of the original particles of ore. With yet higher temperatures, 1100 to 1150° C. (2012 to 2102° F.), the iron begins to flow together, forming a pasty, semi-fused, somewhat porous mass, called a "bloom" which can be taken out and worked under a hammer to form a product similar to wrought iron; it usually contains some inclusions of slag and is too low in carbon to make steel." C. E. Williams, E. P. Barrett, B. M. Larsen, *Production of Sponge Iron*, Department of Commerce, Bureau of Mines, Bulletin 270, 1927.

² Analyses of iron scoria, or slag, found near the various sites attest the relatively low iron yield from the direct process methods of prehistorical times. Cf. Swank, *op. cit.*, p. 76.

³ This is not literally correct, as the first European cast iron was produced about 1340 A.D. The new process, however, did not at once put an end to the old, and until the invention of the Bessemer converter (1856) cast iron was as distinct from the wrought as bronze is from copper.

The advance, in a word, was more apparent than real. That the mediaeval furnace was larger¹ and better controlled is due chiefly to the increased efficiency of the bellows.² When or where these first were made applicable is not known, but the probabilities are that the discovery was made south of the Balkans, and no earlier perhaps than the seventh century B.C.³ Shortly thereafter they appear in the Danube area. Ridgeway, and others, following Quinquerez, have identified pre-Roman furnaces in the Bernese Jura which they claim had been operated with an artificial blast.

It may be safely assumed that bellows were employed throughout Keltic La Tène (500–1 B.C.), and, after the Etruscan collapse (351 B.C.), by the Romans. As far as the Kelts are concerned, the observable effect is one of accelerated diffusion rather than a step-up in unit production. Roman furnaces, too, are seemingly unchanged until the end of the Second Punic War (201 B.C.), when the mineral resources of Spain were wrested from Carthage. Thenceforth, and impelled no doubt by a widening political horizon, Rome grows "iron-minded." In the last years of the Republic her output had risen enormously and was further augmented under the Empire by the accession of Noricum (16 B.C.).

That this increase was due chiefly to the multiplication of units is self-evident, for, though furnaces were then larger, the yield in forgeable iron rarely exceeded one hundred pounds. But if unit production was only slightly increased by the employment of bellows, a marked improvement in quality may be traced to their use. This would be especially true with the manganiferous spathies of Noricum, from which, and at will, the iron-master of the Empire produced steel or high carbon iron. If a hard iron were desired, more and thicker charcoal would be added and, by continuing the process longer with a reduced draft, carbon was absorbed in approximately the required amounts. Obviously, to obtain a soft iron the process would be reversed. Under spur of necessity Rome might have devised mechanical means for creating a blast, thereby anticipating by more than a thousand years smelting of iron on a large scale. Excellence for its own sake was, however, no concern of the Romans, and with iron, as in other industrial activities, mere superiority was the ultimate goal. This may serve to explain why greater progress was made in fabricating and finishing. It was the technique of the East first tapped by Rome in the conquest of Italy (358–266 B.C.) which lay at the base of this branch of her metallurgy.

Pliny and Diodorus are most informing of all the contemporary writers, but as they merely record what they observed, or were told, theirs are the comments of laymen dealing only in episodes. Both make it equally clear that decarburization had long been the bane of the Roman metallurgist; and that to retain hardness, or

¹ The direct process furnace described by Agricola (1494–1555 A.D.) had a rated capacity of "two to three centumpondia," or approximately 175 to 200 pounds, of forgeable iron.

² "The first known representation of any mechanical means for producing a blast is from the walls of a tomb of the period of Thutmose III, supposed to be about 1500 B.C." Henry Louis, "Presidential Address," *The Journal of the Iron and Steel Institute*, No. I, 1929.

³ "And when he calls Anacharsis (a Scythian prince and philosopher resident in Athens about 590 B.C.) 'wise' Ephorus says that he belongs to this race, and that he also was considered one of the Seven Wise Men because of his perfect self-control and good sense. And he goes on to tell the inventions of Anacharsis—the bellows, the two-fluted anchor and the potter's wheel," Strabo, VII, 3, 9 (Trans. Horace L. Jones).

to restore it in the cutting edge was a most difficult problem.¹ How well they succeeded may be judged from the increasing numbers of intricate and highly purposeful tools. That some method of carburization was employed has been convincingly established by the recent metallographic studies of Carpenter and Robinson,² Neumann,³ who has also examined a number of specimens, concludes that the Romans of 200 A.D. were acquainted with carburizing. As to the method itself, Pliny's reference suggests the "boiling in sow metal" process of the late Middle Ages described by Agricola.⁴ Certainly the "*nucleus ferri* especially adapted for hardening" was high carbon iron, since, "prepared in another manner it is suitable for making thick anvils or heads of hammers."⁵

It is highly improbable that such a method of carburizing was ever in general use. Comparable results were more readily attainable, for, as Stead⁶ points out, "it is easy to conceive how pieces of iron could be carburized by embedding them in the heart of a charcoal fire and maintaining them at a high temperature by using a blast insufficiently strong to penetrate to the center of the hearth."

Water was the recognized quenching medium, although, on the authority of Pliny,⁵ many small objects were hardened in oil. Bilbilis, Turiasso, Comum and other localities renowned for their iron may have evolved a tempering process which they adroitly concealed from prying competitors by attributing excellence to the "quality of water into which the red-hot metal is plunged."⁵

It is impossible as yet to affirm or deny that the Romans tempered their carburized iron. The broad assumption is that they did, for it is quite inconceivable that having advanced to this final, all-important phase of heat-treatment they could fail to complete the cycle. On the other hand, successful tempering requires controlled temperatures regulated to the varying composition of the iron-carbon alloy. Tempering would, therefore, be only possible in those favored localities where repetitive operations with a uniform product afforded opportunity for observing the effects as measured by the various oxidation colors. Even at best the difficulties were enormous and the results always uncertain.

There is nothing to indicate that the Romans ever made iron or steel by a fusion process. That they occasionally produced an amorphous iron carbide is apparent from the statement of Pliny⁵: "It is a remarkable fact that when iron ore is fused it becomes liquefied like water and afterward acquires a brittle, spongy texture." As no further comment is made, and as no other Latin writers refer to a fusion process, it is reasonable to assume that such fortuitous production was considered a

¹ One of the most unique solutions of this perplexing problem is attributed by Diodorus, V, 11, to the Celtiberians: "They make weapons and darts in an admirable manner; for they bury plates of iron so long under ground till the rust hath consumed the weaker part, and so the rest becomes more strong and firm. Of this they make their swords and other warlike weapons; and with these arms, thus tempered, they so cut through every thing in their way that neither shield, helmet nor bone can withstand them."

² Sir H. C. H. Carpenter and J. M. Robertson, "The Metallography of Some Ancient Egyptian Implements," *The Journal of the Iron and Steel Institute*, No. I, 1930.

³ B. Neumann, "Römisches Eisen," *Zeitschrift für Elektrochemie*, XXIX, p. 177.

⁴ Georgius Agricola, *De Re Metallica*, Ch. IX (Trans. Herbert C. Hoover—Lou Henry Hoover).

⁵ Pliny, *N. H.* XXXIV, 14, 41.

⁶ J. F. Stead, *The Journal of the Iron and Steel Institute*, No. I, 1912, p. 133.

total loss, and the resulting metal either scrapped or reworked with subsequent charges. But if Rome was ignorant of, or oblivious to, the merits of a fusion process, there is tacit recognition of it in the fact that steel for their best implements and weapons was brought in from the East.¹ Pliny wrongly credits the Chinese, but in this he is purposely misled, as were the more skeptical Roman ambassadors referred to by Gibbon.² It is now known that this steel, so highly prized by the Romans, was a product of India, made from the black magnetite sands of Hyderabad. And as Damascus or Wootz, this Indian-made steel was held in equal esteem by mediaeval and modern Europe. Around its production the craftsmen of the East drew a veil of secrecy, and it is only in recent years that the researches of Anossof, Belaiew, Zschokke and others, separating legend from fact, have laid bare the essential characteristics of the process.

The charge, consisting of black magnetite ore, bamboo-charcoal and the green leaves of certain carbonaceous plants, was sealed in a crucible made from native clay. Several of these would be set in the hearth which was then filled with charcoal and the furnace lighted. Gradually raising the temperature to a point where the charge became molten (approximately 3000° F.), an iron-carbon alloy was thrown out of solution and solidified in mass at the bottom of the crucible. This metallic button or mass, mechanically separated from its slag, was then alternately melted and cooled again four or five times — each complete operating cycle requiring a day. Then in round cakes about five inches in diameter and one-half inch thick, each of which weighed approximately two pounds, the metal was carried overland by caravan to the arms-making centers of western Asia; or if for export, to the various shipping points. A long normalizing treatment preceded the forging operation which was done with great care, flowing the metal in two or more directions with light blows of the hammer. After prolonged annealing the blades were quenched and drawn to the desired hardness, then polished and etched. This last operation brought to the surface the damask inherent in the steel; and its pattern and background color determined the quality.³

Belaiew⁴ contends that the best Damascus is a hyper-eutectoid steel and gives the analysis of an unusually beautiful blade as:

C	Mn	Si	S	P
1.49	.08	.005	.05	.10

True Indian steel was in no way related to the degenerate wrought product composed of bars and wire welded together, and then falsely damascened by cross forging. It is also distinct from the Persian, where the charge, although melted in crucibles, was wrought iron and charcoal.⁵ Pliny⁶ is undoubtedly referring to steel

¹ E. H. Warmington, *op. cit.*, p. 258.

² Edward Gibbon, *The Decline and Fall of the Roman Empire*, Ch. XLII, Note 24.

³ The description of the process is adapted from the text of an article by T. O. Court in the *Iron Trade Review*, February 11, 1926, supplemented by, and compared with, the more specific information contained in the treatise of Col. N. Belaiew, "Damascene Steel," *The Journal of the Iron and Steel Institute*, No. 1, 1918.

⁴ N. Belaiew, *op. cit.*, p. 427.

⁵ Such a process is described by Swank, *The History of the Manufacture of Iron in All Ages*, 1892, as contemporary in the Trichinopoly district of the Madras Presidency, India. The description, interesting

produced by this process when he rates Parthian iron as next in rank to iron made by the "Seres."

No precise information exists as to the method employed by the Chalybes. Strabo¹ mentions their iron mines and Pliny² their forges. Aristotle's brief account³ holds the only clue, implying as it does that a crucible process was used.⁴ Nor is it impossible that the writers again were deliberately misled and that the Chalybe, after all, merely served as a cloak for the actual producer. Be that as it may, they and their iron were already a tradition in the days of Aeschylus, a tradition that still lives in Anglicized form in our word, "chalybeate."

Other than the Indian and the Chalybian, iron-making in the East seems to have followed the European method, or, in the less accessible areas, to have been a yet cruder survival of neo-primitive forms. Subsequent research may perhaps prove the Assyrians an exception. Judged solely by amount, the iron at Nineveh represents either a gradual accumulation through conquest and trade or the large-scale production of a super-technique.

As a dynamic entity ancient civilization ends with the reign of Hadrian, though outwardly it lingers a few centuries more. And it is from this, the post-ancient period, that two most remarkable specimens of iron have come down. The Delhi column, from which the Indian city takes its name, is dated approximately 300 A.D. Whether built-up by welding small sections or forged in a single unit, it attests the skill of the unknown iron-master of sixteen centuries ago. The shaft itself, 12½ inches in diameter at the top and 16½ inches at the base, is nearly 24 feet long, and weighs by estimate somewhat more than six tons. Hadfield,⁵ who microscopically examined a small section, reports the analysis as follows,

C	Mn	Si	S	P	Fe
.08	Nil	.046	.006	.114	99.70

with specific gravity at 7.81 and a Brinell hardness of 188. Obviously the hardness is not representative, for it compares with the working maximum obtainable from a heat-treated .40 to .50 carbon steel of equivalent mass. Neither microscope nor analysis have yet given a clue to what is metallurgically the most significant characteristic of this remarkable column: its corrosion resistance. There it stands after sixteen hundred years of exposure to the elements in as perfect condition as when first erected. It is decidedly questionable whether modern iron or steel, similarly exposed, could have endured that long.

The site of Roman Corstopitum lies immediately west of the English village of Corbridge on the north bank of the Tyne. Here the largest known mass of Roman iron was found in 1909. From the collateral evidence a fourth century A.D. dating

in itself, is significant of the many reasons why the primitive metallurgist did not generally adopt a crucible process in the making of iron. The clay is far from being refractory; the yield is meagre with an enormous expenditure of effort; bellows are necessary to raise temperature within the crucible to the melting point of iron (2768° F.).⁶ Pliny, *l. c.* ¹ Strabo, XII, 3, 19-20. ² Pliny, *N. H.* VIII.

³ Aristotle, *De Mirabilibus Auscultationibus*, Ch. 48.

⁴ See note 6, p. 566.

⁵ Sir Robert Hadfield, "Science Analyzes the Iron Pillar of Delhi," *Iron Trade Review*, November 26, 1925.

may be safely assigned. The examinations of Louis and Stead¹ have disclosed not only the characteristics of the bloom itself, but in general the difficulties inherent to the production of large masses by the ancient methods. Found in what appears to have been a reheating furnace, the bloom measures 39 inches in length, and is approximately 7 inches square at one end and 5 inches square at the other. Its net weight is 344 pounds. That work was in progress when the bloom was abandoned is apparent from a photograph of the longitudinal section, which also reveals what has long been suspected, that the larger masses of ancient iron were composed of small sections welded together. Based on Stead's drawing, the largest single unit in the Corstopitum bloom did not exceed forty pounds in weight.

Chemical analysis showed the usual variation in carbon for direct process iron, this ranging from .02% in one section of the lower end to .29% in another near the top. The average composition according to Stead is

C	Mn	Si	S	P	Cu	Slag
.097	.04	.046	.025	.044	.01	.38

Compared with the Delhi iron, the essential difference is a lower phosphorus content and the inclusion of slag. Surface corrosion, non-existent in the column, has penetrated the bloom to a minimum depth of one quarter inch.

It is interesting to observe that Hallstatt and La Tène iron, judged by analysis alone, is not inferior to either the Delhi or Corstopitum metal. It also compares favorably with modern wrought iron.

	HALLSTATT ²		LA TÈNE		MODERN
	<i>Sword</i>	<i>Lance</i>	<i>Lance</i>	<i>Ring</i>	<i>Muck Bar</i>
C	.17	.63	.10 to .53	.21	.06
Mn	...	...	...	...	.07
Si	.04	.046	.255	.056	.15
P	.01	.045	.05	.122	.10
S	.008	trace	.019	.031	.016

Possibly the higher carbons of the La Tène and Hallstatt iron were intentional but, if so, they reflect the indeterminate technique of the primitive iron-master.

If the iron anchor found in Lake Nemi can be authoritatively dated to Caligula's reign, that, and not the bloom of Corstopitum, is the "largest known mass of Roman iron." According to Speziale (*The Mariner's Mirror*, XVII, No. 4, October 1931), the Nemi anchor weighs 1275 pounds, and is "forged from four lumps of metal—three for the shank and arms and one for the stock."

ADDENDA

In the 1932-33 excavations at Tell-Asmar a bronze lattice-work dagger handle was found, to which a 28th century B.C. dating has been assigned by Dr. Frankfort.

¹ Sir Hugh Bell, "Notes on a Bloom of Roman Iron Found at Corstopitum," *The Journal of the Iron and Steel Institute*, No. I, 1912.

² There is apparently only a meagre literature on Hallstatt iron. This is regrettable, for much could be learned from metallographic studies of specimens now in the British and Vienna Museums. The analyses given (the only ones published of which the author has knowledge) are taken from an article by B. Neumann, "Römisches Eisen," in *Zeitschrift für Elektrochemie*, XXIX, p. 175.

A metallic fragment wedged in the slot and another trapped inside the handle were analyzed by Cecil H. Desch, who reports both specimens to be "rusted iron, converted as usual by long contact with the earth into a hard, magnetic, crystalline mass. Moreover, analysis shows that this iron is free from nickel and is therefore not of meteoric origin." As the associated remains were dedicated to temple service, the dagger itself may be classified, perhaps, as a ceremonial object. For such service, any kind of iron would suffice, even unsmelted, hard hematite. In any event, as far as the purpose of the present study is concerned, the Tell-Asmar dagger is another "sporadic" exhibit. Cf., Henri Frankfort, *Iraq Excavations of the Oriental Institute 1932/33*, University of Chicago Oriental Institute Communications, No. 17, pp. 59-61. But the Tell-Asmar dagger, and similar finds, call for constant restatement of the main issue. Is "sporadic" iron from the Near East to be taken as evidence of origin? Peake, Cumont and others (cf., Harold Peake, "The Origin and Spread of Early Iron Working," *Geographical Review*, Vol. XXIII, No. 4, October 1933; Franz Cumont, *Études Syriennes*, 1917), to mention only a few, view such objects in that light. They seem to ignore the possibilities of diffusion from some other point through the medium of trade. The problem, indeed, is complex. In the final analysis, it comes down to a choice between the literary testimony of the ancient East and the objective evidence from Hallstatt, Glasinatz and Bologna.

HARRY CRAIG RICHARDSON

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ARCHAEOLOGICAL NEWS AND DISCUSSIONS¹
NOTES ON RECENT ARCHAEOLOGICAL EXCAVATIONS
SUMMARIES OF ORIGINAL ARTICLES CHIEFLY IN
CURRENT PUBLICATIONS

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NECROLOGY

Joseph Loth, who, from 1884 to 1910 taught Greek and Celtic at Rennes and later was professor of Celtic language and literature at the Collège de France, died April 1, 1934. In 1919 he became a member of the Académie des Inscriptions et Belles-Lettres. He was the author of *De vocis Aremoricæ forma atque significatione*, *Emigration bretonne en Armorique*, a treatise on the names of Briton saints, and *Contributions à l'étude des romans de la table ronde*. He made an intensive study of place names in Ireland and Cornwall, likewise of Gallic inscriptions in Brittany. Loth was also profoundly interested in racial problems and contributed to this field.

Serg d'Oldenbourg, distinguished inspirer and organizer of oriental studies, especially Indian and Aryan, founder and director of the Bibliotheca Buddhica and of archaeological investigations in Central Asia, died in 1934. To him orientalism is

greatly indebted for its progress in the past five years. He dedicated himself to the organization, on a methodical basis, of the scientific activity of Russia. While still young, he was elected secretary for life of the Academy of Sciences, and from this central post he was able to discover and encourage research scholars and to coördinate their investigations, and thus to assure a unity of effort.

Edmond Pottier.—Died at Paris on July 4, 1934. He was born at Sarrebrück, August 13, 1855. He was educated at the University; later appointed Keeper of the Louvre and a Professor at the School of the Louvre. He was a member of the Institute (Académie des Inscriptions et Belles-Lettres) and a Commander of the Legion of Honor. He specialized in the study of Greek pottery and terracottas, and was the prime mover in undertaking the publication of the *Corpus Vasorum Antiquorum*. Other works include: *Les Statuettes de terre cuite dans l'antiquité*; *Catalogue des vases antiques du Louvre*; *Album des vases antiques du Louvre*; *Les Lekythes blancs attiques à représentations funéraires*; *Les Céramiques de la Grèce propre*; *La Nécropole de Myrina* (with S. Reinach); *Catalogue des terre cuites et autres antiquités trouvées dans la nécropole de Myrina*; *L'Art Hittite* (1926). He was also co-editor with Reinach of the *Revue Archéologique* from 1914 until his death.

GENERAL

The Origin of the Chimaera.—The fantastic form given by the Greeks to the mythical fire-breathing goat is evidently not their own invention, but derived in some way from the Orient. A preliminary stage to the monster with goat head and neck growing inorganically from the back of a sometimes snake-tailed but otherwise normal lion is found in the numerous instances of a beast with curling wings ending in a human, animal, or griffin head. These heads have much the same

¹ The department of Archaeological News and Discussions and of Bibliography of Archaeological Books is conducted by Professor DAVID M. ROBINSON, Editor-in-charge, assisted by Professor SAMUEL E. BASSETT, Professor CARROLL N. BROWN, Miss MARY H. BUCKINGHAM, Professor SIDNEY N. DEANE, Professor ROBERT E. DENGLE, Professor VLADIMIR J. FEWKES, Professor JOHN W. FLIGHT, Professor HAROLD N. FOWLER, Dr. SARAH E. FREEMAN, Professor HENRY S. GEHMAN, Mr. E. BJÖREN GETZE, Dr. GERTRUDE GREYHER, Dr. BATTISCOMBE GUNN, Professor FRANKLIN P. JOHNSON, Professor ROLAND G. KENT, Dr. STEPHEN B. LUCE, Professor CLARENCE MANNING, Professor GEORGE E. MYLONAS, Professor KENNETH SCOTT, Professor JOHN SHAPLEY, Professor EPHRAIM E. SPEISER, Professor FRANCIS J. TSCHAN, Professor SHIRLEY H. WEBER, Professor FRED V. WINNETT, and the Editors.

For an explanation of the abbreviations see Vol. xxiv, 1, p. 124, and Vol. xxix, 1, pp. 115-116.

position with respect to the body of the creature as the extra head of the chimaera. Such head-winged animals are found in Luristanian, Assyrian, and other Asiatic art and in early Greek art, as well as in Etruria and even Romanesque France. Their east-to-west progress suggests the probability that the rhyton also travelled from Persia to Greece, not *vice versa*, as has often been assumed. The figure on a glass plaque from the royal tombs of Dendra, which has been interpreted as a Mycenaean chimaera, if closely examined, appears to be the common theme of a lion attacking its prey, here a goat. (ANNE ROES, *J.H.S.* liv, 1934, pt. i, pp. 21-25; 8 figs.)

The Oriental Origin of Herakles.—Among the designs on Sumerian and Assyrian seals found in the ruins of Eshnunna, a city of Iraq destroyed and abandoned in the twentieth century B.C., are seen the conquest of a seven-headed serpent, and a god with lion-skin, club and bow. From this early vegetation deity, already combining solar and chthonic characters, to the Greek Herakles, a long line of descent can be traced, with many ramifications, Persian, Indian, Egyptian, Phoenician, Hittite, Anatolian, and in many personifications, of which Marduk, Melkart, and Sandas are the most prominent, but including also the Israelite Samson. The route to the Aegaeon lay through Asia Minor, and the latest carriers were the -nd- and -ss- people called Luvians, who migrated from S. W. Asia Minor to Crete and the other islands, bringing their "ur-firnis" ware. The story of the Greek Herakles, with his twofold nature in which the hero predominates over the god, bears many traces of this journey through time and space:—the contests with younger gods in the rescue of Alcestis, Theseus, and Prometheus; the labors undertaken in behalf of suffering humanity; the rebirth through an expiatory burning on Mount Oeta; the founding of the Olympic foot-race as an Idaean Dactyl among other Kuretes; the fatal return of the hydra's poison through Nessus and Deianeira; the twin pillars; the association with the goddess Omphale as young consort. The evidence is both archaeological and literary. (G. R. LEVY, *J.H.S.* liv, 1934, pt. i, pp. 40-53; pl. II, 7 figs.)

Antiquities at Braunsberg.—A. GREIFENHAGEN, *Arch. Anz.*, 1933, pp. 419-453, publishes a catalogue of antiquities belonging to the Staatliche Akademie at Braunsberg. A plaster head from an Egyptian mummy-portrait of the first century after Christ, a Hellenistic Triton torso,

and a Roman sarcophagus with a wedding scene are noteworthy; these are discussed at some length.

EGYPT

Egyptian Bronzes.—G. ROEDER, *Jb. Arch.* I, xlviii, 1933, pp. 226-263, studies the technique of small Egyptian bronzes. They were made from wax models whose various parts, as a rule, were made largely in moulds. Hand work was necessary only in joining the wax pieces, ordinarily ten to fifteen in a single figurine, and in small intervening portions. Sometimes incongruous combinations result. Examples of this technique are most abundant from the Ptolemaic and Saite periods; but it is attested for the Empire and Middle Kingdom and perhaps for the end of the Old Kingdom. The Minoans did not use it; the Greeks used it somewhat in early times, not thereafter; it is not found in Mesopotamia or in Asia west of there, but occurs in the Luristan bronzes and in prehistoric bronzes of northern Europe. Obviously it did not encourage innovations in style. Some Egyptian bronzes, for which the wax was moulded by hand, show greater freedom.

Exodus.—Modern opinion with regard to the route of the Israelite refugees inclines to the view that they took the extreme northern route along the shore between the Mediterranean and Lake Bardawil where the pursuing Egyptians were bogged and overwhelmed. (*Palestine Exploration Fund*, April, 1934.)

Tanis.—M. PIERRE MONTET discovered at Tanis a large brick enclosure with a brick edifice inside it, under which were foundation sacrifices. This indicates that it is Semitic and not Egyptian. It seems to have been a *ziggurat*. Whether it was built by the Hyksos in honor of their god Seth, or by the Hebrews who had memories of Mesopotamia, cannot be determined. (*Palestine Exploration Fund*, April, 1934.)

Tell-el-Amarna.—A brief summary of the last campaign conducted by the Egypt Exploration Society's Expedition on the site of Akhetaten is given by the Director, J. D. S. PENDLEBURY, in *The Illustrated London News*, Sept. 15, 1934, pp. 386-389. This city, which was built by Akhenaten, and for a short time in the fourteenth century displaced Thebes as the capital of Egypt, was ruthlessly destroyed by his successors. A thorough investigation was made of the scanty remains of the Great Temple to the Sun, a complex of passageways and open courts extending for nearly a thousand yards. With the help of representations

of the building found in tombs it was possible to restore both plan and perspective with some certainty. Further excavation on the site of the Records Office added seven new fragments to the "Amarna Letters." Near-by, a building was identified by inscribed bricks as "The House of Life," an Egyptian University. Some inscribed potsherds were found there with lists of Royal Scribes. The latter part of the season was devoted to clearing a well-equipped police station on the outskirts of the town. Small finds of interest included a number of sculptor's trial pieces, a fine carved wooden box-lid and a scarab of Amenhotep III, recording his prowess as a hunter of lions.

THE ORIENT

ASSYRIA AND BABYLONIA

A Parallel Between Indic and Babylonian Ritual.—In *J.A.O.S.* 54 (No. 2, June, 1934, pp. 107-128), W. F. ALBRIGHT and P. E. DUMONT discuss some interesting parallels between certain sacrificial rites in the Indus Valley and Mesopotamia. They begin with a comparison of the Vedic horse-sacrifice (ašvamedha, the highest ritual manifestation of royal power) with practices described in a ritual text from Assur, the first recension of which dates from ca. 2100-1800 B.C. Among the striking similarities in these rituals are: in both cases incantations in praise of the horse are whispered into the animal's ear by the priest; both represent a bloody sacrifice primarily intended to increase fertility; both require the mark of a tuft of hair, or a group of seven tufts, identified with the Pleiades (associated with rain and inundation, hence fecundity). Another parallel noted is that of a Babylonian ritual custom requiring the sacrificer to stand behind the priest, touching him during the ceremony, which is notably similar to the Vedic Soma rite in which the sacrificer takes hold of the priest and stands behind him. Some difficulties stand in the way of exact chronological disposition of these ritual elements, but "the balance seems to incline slightly in favor of an ultimate Babylonian origin of part, at least, of the homologous rites" discussed in the article.

Babylonia.—CYRUS H. GORDON copied and translated with notes the text of six Aramaic Magical Bowls in the Istanbul and Baghdad Museums. They are original and contemporary documents reflecting life and beliefs in Babylonia about the time of the Islamic conquest and immediately thereafter. (*Archiv Orientalni*, June, 1934.)

Sculptures of Sakjegeuzi.—D. M. VAUGHAN (*Liverpool Annals*, xxi, 1934, pp. 37-41) comments on two unique features of the dado-sculptures of Sakjegeuzi which have escaped notice: a three-quarter view of the human face and a gradation, in both height of relief and psychological interest, in the sculptures of the portico.

Iraq Museum.—In *Archiv für Orientforschung*, ix, 1934, pp. 165-171, Mrs. E. DOUGLAS VAN BUREN discusses "A Clay Relief in the Iraq Museum." It illustrates a goddess seen in frontal aspect, who holds the head of a child whom she suckles at her breast. Above the shoulders of the goddess appear two disembodied heads, and at her feet crouch two emaciated beings. In the background, suspended from pegs, are two objects resembling looped bands which curve outward and roll up into spirals.

Although this band-symbol is known from several monuments and cylinder seals, its meaning has not been thus far satisfactorily explained. The present monument suggests at last a plausible solution. The goddess in question is Ninkhursag, Goddess of Childbirth, who alone of all the important female deities has not been typified hitherto by an appropriate symbol. The band-symbol proves now to have been associated with her; it obviously represents swaddling bands. The five beings which surround the goddess on the Iraq relief are not children of flesh and blood, but potential human beings not yet materialized, and the suspended looped bands are the swaddling bands with which the new-born infants will be bound. A new and fascinating chapter in religious thought is thus revealed by the humble terracotta relief.

Iraq.—The results of MR. MALLOWAN's recent expedition to Iraq are now being exhibited in the British Museum; they give a picture of a civilization antedating any pictographic records which the discoverer places as far back as 5000 B.C. The finds include amulets, images of the Mother Goddess, elaborate seals, miniature double-headed axes in soapstone, and an amulet made in the form of an accurately copied human fingerbone. Wheat and barley were found in the granary in the lowest settlement; there had been no evidence of grain grown at so early a period until now. (*Palestine Exploration Fund*, April, 1934.)

SYRIA AND PALESTINE

Prehistory of Palestine.—An admirable synthesis of the results of anthropological, archaeolog-

ical, and other branches of research relating to the prehistory of Palestine is presented by M. RENÉ NEUVILLE, French vice-consul at Jerusalem, in the *R.B.* xliii, 1934, pp. 237-259 (11 plates). He accepts Breuil's classification of the industries of the Lower Palaeolithic into two groups: (1) those in which the tools were made from flakes ("les industries à éclats"—Clactonian, Tayacian, Levalloisian, Mousterian), and (2) those in which they were made from cores (*les industries à bifaces*)—Chellean, Acheulean, Micoquean). These two groups are not to be regarded as following each other in chronological succession but as contemporaneous over a considerable period. The flake industries had their centre in the North and East, the core, or *coups-de-poing* industries in the South and around the Mediterranean. Shifts of population due to climatic and other causes led to their alternation in given areas and eventually to their practical assimilation. Of the *coups-de-poing* industries, the Chellean occurs sporadically in Palestine, the Acheulean is quite common. Of the flake industries, all are represented but the Clactonian. The oldest human remains found in Palestine were associated with the Levalloisian industry. They suggest a type of man possessing characteristics of both the Neanderthaloid and *Homo sapiens*. The introduction of the industries of the Upper Palaeolithic are associated, as in Europe, with the arrival of a new species of man, very different from the Neanderthaloid but still possessing many primitive characteristics. The Mesolithic period (Natufian industry) shows a marked advance in civilization, the beginnings of art and agriculture. The Natufians were probably Mediterraneans, having traits in common with the negroids of the Aurignacian industry of southern Europe and also, but to a less degree, with the predynastic Egyptians and the Capsians of North Africa. Of a Neolithic culture in Palestine, i.e. a culture practising the polishing of stone, there is no trace. The Mesolithic is followed by the Aeneolithic period and Tahunian culture. Metal and pottery now make their appearance. The Ghassulian culture Neuville makes contemporaneous with the Tahunian. Its origins are unknown. Both are followed by the Canaanite Bronze I.

Bethel.—In early times the meteorite was identified with the thunderbolt. Egypt has a number of sacred meteorites. At Thebes the title of the high priest was "The Opener of the Gates of Heaven." As at Thebes, so at Letopolis there

were heavenly gates which were reached by a ladder. It is said (ca. 2600 B.C.) that Pepi enters the sky by a ladder. Originally the ladder of Letopolis was composed of material provided by meteorites, i.e. iron. In view of this, Mr. G. A. WAINWRIGHT concludes that Jacob's *bethel* was not merely a sacred stone of any sort, but was definitely a meteorite. It appears that the Greek *βαίρυλοι* (<*bethel*) were also meteoric stones, and so this fact clinches the argument that Jacob's *bethel* was one too. The *omphalos* was a substitute for a meteorite. Jacob's *bethel* had the same effects as some Egyptian sacred meteorites; it showed him the splendor of heaven and provided a ladder from earth to heaven. (*Palestine Exploration Fund*, Jan. 1934.)

Excavations at Beth-Shan in 1933.—A remarkable feature was the apparently defenseless state of the city. No trace of a rampart or town wall was found; at each level the small walls of houses ran out to the very edge of the Tell.

In Stage V several seal-impressions came to light which have been dated in the early part of the Early Dynastic Period of Mesopotamia, i.e., about the first century of the third millennium. The resemblances between the Palestinian pottery of the Early Bronze Age and that of Predynastic Egypt warrant us in carrying back the more primitive types of the lowest levels well into the fourth millennium. (G. M. FITZGERALD, *Palestine Exploration Fund*, July, 1934.)

Beth-Shemesh.—A tablet written in Ras-Shamra script has been discovered at Beth-Shemesh. This discovery lends support to the theory maintained by Gaster that the Semitic civilization of Ras-Shamra (Ugarit) was imported from the Negeb and the Sinai peninsula. He assigns these reasons for this provenance: the legends on the Ras-Shamra tablets deal with events of the Negeb; the pantheon and cultus at Ras-Shamra are full of southern elements; the language of these tablets, furthermore, has close affinities with South Semitic. (THEODOR H. GASTER, *Palestine Exploration Fund*, April, 1934.)

Gezer.—At Gezer was found the handle of a pot which had three letters in the Sinaitic script; it is attributed to the Middle Bronze Age, i.e., about 2000 to 1600 B.C. (*Palestine Exploration Fund*, Quarterly Statement, July, 1934.)

Gezer.—The modern name, Tell el-Jezereh, is a survival of the ancient appellation. The recorded history of Gezer as a series of battles and sieges extends about 3000 years back from 1495 A.D.,

but the archaeological remains carry our information back another thousand years.

The earliest inhabitants of Gezer were Trogodytes, apparently non-Semitic, living in the caves which riddle the hill surface; it seems that they knew cremation. About 3000 B.C. a race with a relatively high civilization fortified the whole hilltop. A later wall, built about 1500 B.C., lasted until about 100 B.C. Within the city walls the foundations of some seven or eight cities of various successive periods were found superimposed one above the other. The city's best days appear to have been shortly before the time of Joshua; the next perhaps at the time of the Judges. With the period that corresponds to the arrival of the Hebrews, there was a great increase of population.

The discovery of the great "High Place" has thrown a flood of light upon the religion of the Canaanites.

The Gezer tunnel, which was excavated with flint knives about 2000 B.C., was finally abandoned about 1400 B.C. In Maccabean times the water-supply of the city in time of siege was dependent upon an enormous open cistern which held about 2,000,000 gallons of water. (E. W. G. MASTERMAN, *Palestine Exploration Fund*, July, 1934.)

Jerash.—The work at Jerash in the fall of 1933 was concentrated mainly around the North Gate, a complete restoration of which is now offered by MR. DETWEILER (*B.A.S.O.R.* 54, pp. 5-13, 21-24). In the débris around the gate, four additional fragments of the two dedicatory inscriptions were found. The largest affords a striking confirmation of the R. P. Abel's conjectural restoration of the inscription published by him in the *R.B.* (1927), pp. 251-253. Only one change is necessary; the second numeral in line 3 is *theta* (nine), not *iota* (ten). Thus the inscription must be dated either very late in A.D. 114 or very early in 115.

Khirbet Fahil.—The burial grounds of Khirbet Fahil are extremely extensive, but all the cemeteries have been systematically robbed. The buildings in this place are badly preserved, but there is a large basilica. The church dates from the Byzantine period, probably the fifth or sixth century. The bulk of the pottery is Byzantine, but there are a number of Roman sherds. On the summit of the Khirbet is found Mediaeval Arabic glazed slip ware. Sherds of the Bronze Age or the Early Iron Age are very scarce. (*Palestine Exploration Fund*, Jan. 1934.)

Megiddo.—The lower eastern slope of Megiddo was recently excavated to provide an enlarged

area for earth from the top of the hill. In stage V² were found four animal cylinder seal impressions; they go back to the early part of the Early Dynastic Period, i.e., the first century or so of the third millennium. The territory of origin seems to have been eastern Sumer and the western border of the Persian Highland. One of these seals (B) shows the *tête bêche* arrangement, while the last one discovered (F), might more appropriately be described as *dos-à-dos horizontal*. (ROBERT M. ENGBERG and GEOFFREY M. SHIPTON, *Palestine Exploration Fund*, April, 1934.)

Moab.—MR. J. W. CROWFOOT reports that four years ago there was found by Mr. Head at Balu'ah, a place in Moab, a rude slab of basalt on which was depicted a worshipper standing between two deities. The scene carries us back to the twentieth dynasty, more specifically to the reign of Ramses III; the god on the left holds out an ank to the worshipper in the middle; the latter wears a robe which first became popular under the twentieth dynasty and a soft cylindrical "tarbush" which occurs on representations of the Bedouin chief, Shasu, in the time of Ramses III; the goddess on the right wears a girdle round the waist and a border on her skirt, which are characteristic of the same period. The stele cannot be earlier than the beginning of the twelfth century B.C. (*Palestine Exploration Fund*, April, 1934.)

Ras Shamra.—T. H. GASTER maintains that the Ras Shamra texts are for the cultural history of the period (ca. 1400 B.C.) what the Amarna texts are for the political. The ritual at Ras Shamra (Ugarit) has many points of similarity with that of the Pentateuch, and thus we are assured that the cultural content of the Mosaic books is genuinely ancient. (*Palestine Exploration Fund*, July, 1934.)

The Tell Ed Duweir Ewer Inscription.—The *N. Y. Herald Tribune* and *N. Y. Times*, both under date of Oct. 18, 1934, give space to SIR CHARLES MARSTON's discussion of J. L. Starkey's discovery of the Lachish alphabetic script. Sir Charles claims that this script represents one of the stages in development of the Semitic alphabet from Sinai (Serabit) to the later Phoenician alphabet. He suggests a great deal more which cannot be substantiated by historical evidence and which cannot claim space in these columns. An inscription in the same alphabet (as the Lachish one) was turned up four years ago at Beth Shemesh by E. Grant of the Haverford

Expedition, and was noted and discussed by several prominent archaeologists at the time. (See *Syria*, xi, 1930, p. 392; *R. Bibl.* xxxix, 1930, pp. 401-402; *ibid.*, xli, 1932, pp. 281-284; *A.J.A.* xxxv, 1931, p. 97; *et al.*)

Tell Duweir.—MR. J. L. STARKEY found at Tell Duweir a seal of pink limestone with an inscription divided by two horizontal lines; the upper line reads "(belonging) to Shebna" and the lower, "Ahab." The script is the Phoenician type current between 800-600 B.C. The name Shebna occurs in Isaiah 22, 15 and 2 Kings 18, 18 and 19, 2. This seal may confirm Starkey's view that Tell Duweir is the site of Lachish. (*Palestine Exploration Fund*, April, 1934.)

Wady al-Mughara (1932-33).—Excavations were concentrated on the last cave of the group, the Tabūn (Oven). Layer Tabūn C has been placed in the Lower Mousterian. The fauna of this layer is very abundant and points to warm swampy conditions with a heavy rainfall. A nearly complete skeleton of a woman related to the Neanderthal type was found.

Layer Tabūn E has been named Acheulo-Mousterian. The hand-axes are generally rougher than those of the true Acheulian and have probably been made with a stone hammer. A very interesting feature of Tabūn Eb is the presence of a group of Upper Palaeolithic type remains. (D. A. E. GARROD, *Palestine Exploration Fund*, April, 1934.)

The Israelite Occupation of Eastern Palestine in the Light of Territorial History.—In 1925 Professor Alt of Leipzig urged and demonstrated the use of the vast amount of archaeological material at our disposal for a more complete reconstruction of the territorial history of Western Palestine. A. BERGMAN, in *J.A.O.S.* 54 (No. 2, pp. 169-177) shows how the same may be done for Transjordan, by using the abundant information furnished by archaeological progress in this region since 1925. This is the sort of assimilation of archaeological data which must be increasingly made, and which will in time be incorporated into our better histories of the ancient world, thus filling up the many gaps in the previous information available to the student of that world.

Dura-Europos.—A short preliminary report on the last season's excavation at Dura-Europos is given by MR. CLARK HOPKINS in *The Illustrated London News*, Sept. 22, 1934, pp. 421-423. The excavation is being conducted by the Académie

des Inscriptions et Belles-Lettres and Yale University. Undoubtedly the most interesting discovery was that of the Persian siege works which played an important part in the capture and destruction of the city in 256 A.D. A complicated system of tunnels undermining towers and walls can be traced. In some places the wooden beams used to support the walls while the mines were being dug, and which would then be fired, are still in place. Evidence was also found of the efforts made by the defenders to withstand the siege in an embankment built along the wall to prevent its complete collapse.

Discovery of a Lost City in Syrian Desert.—The capital of the ancient kingdom of Mari has been unearthed by the Louvre Expedition under the direction of ANDRÉ PARROT, excavating the mound Tell-Hariri, near Abu Kemal in Syria. Evidence of the wonderful civilization which existed there confirms the importance of the kingdom of Mari, known until this time only from texts and a few scattered monuments found at other sites. The most important discovery was a temple in an exceptionally fine state of preservation. It was dedicated to Ishtar. In its plan, consisting of court and cella, it is similar to other known temples, but it differs in building technique from the methods used in the south. The mud brick walls were covered with plaster which is still intact. Adjoining the cella there was another room and a second court with a flagstone pavement. A great quantity of votive offerings were found, many buried beneath the pavements. They were badly broken and scattered in the destructions which the temple suffered. Among them were several extremely fine objects, including a statuette of a king of Mari, another of the goddess Ishtar, and a seated statuette of an officer. Fragments of a mosaic were found in the small flagstoned court, representing a scene of war; figures of warriors and their captives were in shell inlay. The great importance of the excavation lies in the fact that the civilization of Mari was Sumerian though the people were, from their inscriptions, Semitic. This should help materially in the final solution of the "Sumerian-Semitic" problem. (*The Illustrated London News*, Oct. 13, 1934, pp. 543-545, 547.)

Carchemish.—*Archiv Orientalni*, Dec. 1933, pp. 207-266 are devoted to B. HROZNÝ's attempt at deciphering the Hittite hieroglyphs of Carchemish. The article contains two plates of inscriptions and two of plans of portions of Carchemish.

ASIA MINOR

Cilician Studies.—In *R. Arch.* VI Série, iii, 1933, pp. 155–203 (19 figs.), E. GJERSTAD gives a report of a study made in Cilicia in 1930 of sites dating from the earliest period to the end of the Iron Age. The tells visited are briefly described and next a classification of their pottery with regard to technique, shape, and decoration is made with reference to similarities in other parts of that section of the Mediterranean world. After a brief outline of the myths of the region, the author concludes that Cilician culture “fits in between the Anatolian and Syrian civilizations down to the end of the Bronze Age, when a beginning Mycenaean commercial and colonizing activity sets in, making the country one of the Mycenaean outposts in the Levant. At the beginning of the Iron Age, Cilicia was invaded by migrating Achaean peoples. This archaeological evidence is entirely in accordance with the indications afforded by the literary material.”

Cypriote Vases.—R. W. HUTCHINSON, *Liverpool Annals*, xxi, 1934, pp. 27 f., points out that three vases in the Fitzwilliam Museum, unreligiously said to have been found in Athens, are Cypriote Sub-Mycenaean, 1200–1000 B.C.

Hittites.—B. HROZNÝ considers it an established fact that the Hittites who wrote hieroglyphs are to be distinguished from the Lûites and from the Nesites (who wrote in cuneiform). He maintains that the language of the Nesites and the Lûites as well as the hieroglyphic Hittite belongs to the *centum* group of Indo-European languages. He finds in the very archaic inscription of Topada some light on the habitat of the Hittites who wrote in hieroglyphs. During the twelfth and the eleventh centuries B.C. the habitat of the “hieroglyphic” Hittites seems to have been south of the Halys River, bounded by Ilghin on the west, Mahalich on the south, Topada on the north, and Kaisséri on the east, i.e., in Lycaonia and the surrounding regions. Hrozný believes that before the fall of the Hittite Empire this people occupied Western Lycaonia, Phrygia and perhaps Caria. About 1200 B.C. the invasion of the “peoples of the North,” the Phrygians, the Armenians, and the Mysians drove them toward the eastern part of Asia Minor.

The inscription of Topada leads us to believe that the city of Parmeta was the centre of the “hieroglyphic” Hittite kingdom, which was founded after the fall of Hatti. The names of

three kings of this people are Tuvates and Valu-Dadamemas I and II. The “hieroglyphic” Hittites apparently were the heirs to the Hittite Empire after the fall of Hatti. (*Archiv Orientalní*, June, 1934.)

Vowel Assimilation in Hittite.—W. PETERSEN, in *J.A.O.S.* 54 (No. 2, pp. 161–168), discusses a technical but important point concerning inflectional vowel changes in Hittite grammar. Many examples are adduced to support the theory that the principle of vowel assimilation (or change of the vowel of a preceding syllable so as to conform to that of the syllable following) accounts more satisfactorily and simply for many irregularities in vowel variations than does the widely-held ablaut theory (or gradation, which occurs regularly only before an identical vowel of the following syllable). The proposed theory, it is claimed, obviates the difficulty of accounting for these vowel changes by a complicated and fairly haphazard distribution of ablaut grades, a procedure which could hardly have been a normal usage in the Hittite language.

Nischan Tepe.—HELMUTH TH. BOSSERT discusses Nischan Tepe and Nischan Tash in *Archiv für Orientforschung*, ix, 1934, pp. 172–187. Nischan Tepe is one of the numerous mounds in the neighborhood of Boghaz-köi. It is noteworthy, among others, for an inscription in the “Hittite” hieroglyphic script, which is engraved on a wall of rock and measures ca. 30 feet in length. The writer demonstrates that this inscription had been present when the township was destroyed in the great upheaval which took place at about 1200 B.C. The legibility being very poor, it was necessary to make some one hundred sectional copies of the inscription. The author of the monument is identified tentatively with Tuthaliyas IV.

GREECE

GENERAL

The Rural Dionysia in the Acharnians.—The Dionysiac festival celebrated by Dikaiopolis, with his family, after obtaining his private peace with Sparta, is generally considered to be the Dionysia *κατ'ἀγροῦς* occurring in early winter, in Poseideon, but there were also rural Dionysia in the early spring, corresponding to the Anthesteria at Athens, and the circumstances of the play seem better suited to that season. It was brought out at the late winter festival of the Lenaea, when the citizens would more naturally look forward to the coming festival than back to one that had

passed. Moreover, in the market which Dikaionpolis sets up as his next voluntary move after the sacrifice, fresh vegetables are brought by the countryman from Thebes and a public crier announces the Feast of Pitchers, *χόες*, which was a part of the Athenian Anthesteria. If this conjecture is justified, the ritual found in the play belongs to the spring, not the winter festival. (G. N. BELKNAP, *J.H.S.* liv, 1934, pt. i, pp. 77-78.)

Some Greek Implements of Magic.—In a fresh study of the available evidence for the *ῥυγξ* and *ῥόμβος*, both whirling objects used by Simaetha in her incantation (Theoc. *Idyl.* ii), A. S. F. GOW concludes that the *inyx* named in the ten-times-recurring refrain was originally a wheel with the body of the like-named bird stretched out flat upon it, but had become the object represented in certain vase paintings, jewelry, and frescoes as a small round disc twirled by the alternate slackening and tightening of two cords, or one cord doubled back in a loop, passed through two holes on either side of the centre and held in the two hands of the performer. The rhombus, mentioned only in one of the quatrains which occur between the refrains and deal with various acts intended to bring back the lover, has been identified since ancient times with the *inyx*, but it was really something different, probably like the toy now known in England as a bull-roarer, a small piece of metal or wood so shaped that when whirled rapidly around in a circle at the end of a cord, it gives out a whistling or roaring sound. Some small bronze objects found at Corinth and now in various museums in Europe have conjecturally been called *inyges*, and they may have had a similar use, but there is no evidence for the name. (No reference is made to similar objects found at Olynthos or the one in Copenhagen. Cf. Robinson, *Ill. London News*, 1932, p. 175; *A.J.A.* xxxvi, 1932, p. 126, where they are called children's rattles.) They consist of a hollow disc formed of two shallow bowls put together rim-to-rim and pivoted between the branches of a forked staff so that it can be revolved. The Latin *turbo* may or may not represent the Greek *inyx*. (TAVENNER, in *Trans. Am. Phil. Assn.* lxiv, 1933, pp. 109-127, deals with the same subject in a different way.) (*J.H.S.* liv, 1934, pt. i, pp. 1-13; pl. I, 10 figs.)

EPIGRAPHY

CIG 3304 Revised.—A Greek guild inscription in the Ashmolean Museum, which was brought from Smyrna and published by Chandler in

Marmora Oxoniensia in 1763, has never been satisfactorily understood; but a new and more careful study of the marble, together with allowance for a provincial dialect, has now produced a text that can be reasonably interpreted. It states that a certain Epaphroditus has built a vault beside the path to the Heroön, in which anyone who has been admitted to the guild of flaxworkers may be buried. The name of the guild, *τῶν συππινάδων*, is corrupted from *συππινάς*, from *στύππιον*, tow or coarse flax. This word is often found in papyri with the *τ* dropped; other sources attest the existence of a linen industry in this region. The mention of a test (*δοκιμάσθαι*) for admission to the guild is unique in Greek provincial guild inscriptions. (W. H. BUCKLER, *J.H.S.*, 1934, pt. i, pp. 75-77.)

A Macedonian Military Regulation.—In *R. Arch.*, VI Série, iii, 1934, pp. 39-47 (1 fig.), P. ROUSSEL publishes an inscription cut during the reign of Philip V of Macedon on a block of stone recently discovered in the river Strymon near Amphipolis. It probably came from the interior of some fortified place in that city, and it deals with watchwords, patrols, fines for infractions of discipline, the establishment of royal quarters, and the division of booty.

SCULPTURE

New Bronze Statuette.—In *The Illustrated London News*, Oct. 27, 1934, p. 670, MR. H. G. G. PAYNE, Director of the British School at Athens, discusses briefly a new bronze statuette found near the sanctuary of Apollo Ptous in Boeotia, and now in the Benaki Museum in Athens. The figure, which is 3½ inches high, is of solid bronze with details engraved after casting. It is a figure of Herakles, left foot and arm extended, and right arm upraised. The bow which he would have carried in his left hand is missing, and only a small piece of the club in his right hand is preserved. There is an inscription on the inside of the left leg in the Corinthian alphabet, which reads "Herakeas," apparently a mistake for Herakleas. The use of the Corinthian alphabet in conjunction with definitely Peloponnesian characteristics in the modelling of the body are strong factors for believing that it was made in Corinth. The statuette dates in the decade from 490-480 B.C. as a comparison with other bronzes of the same type shows.

Type of Amazon on Horseback.—In *Jh. Oest. Arch. I.*, xxviii, 1933, pp. 102-111 (5 figs.), AR-

NOLD SCHÖBER casts new light on G. Habich's attempt to connect (in his work, *Die Amazonen-gruppe des attalischen Weihgeschenks*, 1896) three mounted Amazons with the votive Attalid groups set upon or near the south wall of the Acropolis and hitherto best known to us in the two prostrate figures of the Naples Museum. Though the Villa Borghese group has since that date been satisfactorily published by Arndt-Amelung (E.V. 2779-2781), only here has the mounted Amazon of the Palazzo Patrizi in Rome been accurately photographed and reproduced, through the kindness of the Marchioness Patrizi. It represents an Amazon seated on a horse that has stumbled to the ground on all four feet so that the lower shanks of the hind feet are extended on the ground, making the horse's back level so that the Amazon's left foot rests on the ground and her right leg is thrown up toward the horse's neck as though she were about to dismount. The statue was wrongly restored in the seventeenth century, for the chiton (as is shown by a sketch in the Codex Pighianus) was not fastened on the left shoulder, but fell over the girdle and was parted into two flaps by a strap that crossed diagonally from the right shoulder. The base agrees well with those of the figures in Naples (Brunn-Bruckmann *Denkm.*, pls. 481-482) and the treatment of the drapery, with looped folds in violent motion, resulting in zigzag ends, is comparable with that in the mounted Amazon group in the National Museum in Rome, where the prostrate male figure is not original, for the group seems to have been transformed in Roman times to represent the triumph of a "Virtus" over a fallen barbarian. Similar treatment of drapery and similar poses are found in the frieze from the Artemisium in Magnesia on the Maeander (No. 13 of the west frieze and No. 13 of the south frieze). Compare also the Amazon falling from her horse in the Naples Museum. Such drapery cannot have existed earlier than in the Hellenistic period. The measurements of these figures agree almost perfectly with that of the Attalid figures, being about two-thirds life size. The stylistic resemblance with the Magnesia frieze is a strong argument, so Schober thinks, for dating the groups in the time of Attalus II Philadelphus rather than in that of Attalus I, as has usually been done.

Greek Reliefs of Lycia.—In *Sitzungsber. preuss. Akad. Wiss.*, 1933, pp. 1028-1055 (2 pls.), GERHART RODENWALDT discusses the Greek reliefs of Lycia in their relation to the art of Ionia and

Attica and to that of Persia and Mesopotamia. Ionic art itself was strongly influenced by its contact with the Orient, and the non-Greek Lycia lay in that neutral borderland where, especially from the last part of the fifth century on, the two influences were meeting and interacting. To what extent the nature of Greek art was changed for the better or worse by these contacts, Rodenwaldt proposes to show by the study of the artistic form of the Lycian reliefs and of the subjects therein treated. He discusses the early pillar-like grave monuments with their reliefs, the Harpy tomb, the Nereid monument of Xanthos (in its relation to the Nike of Paenionius and to the Mausoleum at Halicarnassus), the Heroum at Trysa (Gjölbashi), and the sarcophagi (a) of Alexander, (b) of the satrap, (c) of the mourners, and (d) of the so-called Lycian sarcophagus. As regards most of these reliefs he thinks the artists or the teachers of the artists were Greeks who were commissioned by the rulers or satraps to execute works whose subjects (e.g. hunting and war scenes) were taken from the traditional life of the wealthy rulers of Persia, who in their turn had been influenced by the royal art of Assyria and Babylonia. Even in the simpler examples of this art Rodenwaldt sees the Greek artist giving touches of individuality, spontaneity, and life to subjects that the Oriental artists had treated formally and typically. He compares these stereotyped galloping horsemen with those of famous Greek friezes and likens the marching Assyrian soldiers to the legionaries of the Column of Marcus Aurelius in Rome. He regards Lycia with its peculiar tomb monuments as the place of origin of the highly ornamental Greek sarcophagi and points to the influence of painting (e.g. that of Polygnotus) on this type of decoration.

The Atlas Metope at Olympia.—In this relief the action of Athena in placing her hand against the sky which Herakles is holding up with both hands and cushioned head, so that he is unable to take the apples offered him by Atlas, has generally been construed as helping Herakles to bear the burden, but it ought rather to be understood as preparing, with a light touch of her divine strength, to take over the whole weight herself, thus breaking the deadlock and enabling Atlas to deliver the apples and resume his wonted task. (S. MILLS, *J.H.S.* liv, 1934, pt. i, p. 78; fig.)

Parthenon Metopes.—Perhaps the westernmost metope on the north side of the Parthenon escaped mutilation because it looked like an An-

nunciation. Possibly the Centaur metopes were similarly spared as symbolic, though Early Christian analogies are few. (G. RODENWALDT, *Arch. Anz.*, 1933, pp. 401-405.)

Three-headed Herm.—R. LULLIES (*Arch. Anz.*, 1933, pp. 453-459) publishes a three-headed herm found near Fiesole and now privately owned in Berlin. One head is a bearded Dionysos, one a beardless male and one female. All appear to be types of the fourth century B.C.; the herm itself should belong to the early empire. It is suggested that three Greek originals which stood in one place are reproduced.

VASES AND PAINTING

Two Paintings on Marble in Vienna.—In *Jh. Oest. Arch. I.*, xxviii, 1933, pp. 79-101 (3 figs., 2 pls.), CAMILLO PRASCHNIKER describes two paintings on marble that had lain almost unnoticed in the storerooms of the Austrian Museum of Art and Industry in Vienna, since the year 1865, when they were acquired through Castellani. Though not unique, the class of paintings to which they belong is relatively small, and these two are in their genre quite remarkable. The better of the two from the point of artistic execution is the more fragmentary, and the surface is injured in many places by a crystalline deposit. It represents an almost nude Dionysus, inclined toward the right side of the painting and leaning heavily on a satyr wrapped in a long cloak who supports himself with a club-like thyrsus; Dionysus' mantle hangs from his shoulders behind and sweeps around his right thigh. On the other side, the spectator's left, is a pillar-like altar, decked with garlands, and between this and the main group are one or (according to the restoration and placing of the fragments) two female figures, a flute-player and a dancer. The upper part of another satyr appears in the background above the altar. The second painting is, like the first, on a coarse-grained marble, and represents a seated Apollo, who—like the Bacchus—is nude except that a part of his mantle comes over his shoulder from behind and also swings round below and covers his right leg. His left hand passes behind a ten-string kithara and touches its strings, while his right hand is extended toward a column which supports a small female figure, with a long peplos, a polos on her head, and her forearms stretched out sideways. In the upper left-hand corner is represented a winged Pegasus, supported on a column. The first of the paintings is dark in tone,

the brownish-red colors being lightened here and there in the case of the clothing with yellows and light browns. Gold was used freely in appropriate places, and is in general lighter in color and more airy in treatment. In the last part of the article the author treats of technical details in the use of the colors, discussing the possible use of oil, wax, white of egg (tempera and encaustic), and the mode of application of the gold-leaf.

ITALY GENERAL

Italy.—OTTO BRENDDEL's report on archaeological discoveries in Italy, Italian Africa, and Albania, October, 1932, to October, 1933 (*Arch. Anz.*, 1933, pp. 566-656) is not summarized, since it is a summary itself and is largely anticipated by the News Items from Rome; but it deserves mention for its fullness, clear arrangement, and illustrations. Among these are a head of the Cassel Apollo type, more archaic-looking than most copies; a good example of the "Valentini Aphrodite" type, with an ivy-wreathed head that apparently belonged; and a fine Roman portrait head of the third century, notable for the indicated movement of the eyes.

The Work of French Scholars on the Roman World in the Last Twenty Years.—In *Mél. Arch. Hist.* I, 1933, pp. 5-41 (5 figs.), J. CARCOPINO presents a summary of the work in Roman studies by French scholarship. He first deals with excavations and finds in France and books dealing with Roman Gaul. Next he treats of excavations in Northern Africa, in Tunisia, in Algeria, in Morocco, and in Syria, especially at Doura-Europos and at Palmyra. The final section of his paper is devoted to recent philological, historical, and linguistic studies published by French scholars.

ARCHITECTURE

Basilica of St. John Lateran.—Taking advantage of the repaving being done in the Basilica, PROFESSOR ENRICO JOSI, Inspector of Pontifical Excavations, has been investigating the ground below the building. Parts of two Roman buildings of the Imperial period have been found, one above the other. Immediately below the nave two rooms were cleared and identified by an inscription as part of the *schola*, or club, of the *equites singulares*, the emperor's bodyguard. It dates from the end of the second century A.D., and is expected to be of considerable importance

in locating other buildings erected at this time. Below this structure were four rooms from the servant quarters of a private house, dating about one hundred and fifty years earlier. Exceptionally fine mosaic pavements and well preserved wall decorations were found. More of these two buildings will be cleared as other sections of the church floor are removed. Some fragments from the earliest Basilica were found, including pieces of yellow marble revetment, from which it had received the name of "Golden Basilica." (*The Illustrated London News*, Sept. 29, 1934, p. 483.)

Corinthian Capitals.—K. RONCZEWSKI (*Arch. Anz.*, 1933, pp. 408-419) publishes a group of Corinthian capitals which have certain features in common: the usual volutes do not rise to the corners of the abacus, but have other spirals above them; there is a rosette in the centre of each face, and a palmette against the abacus. In another group similar features occur along with a pair of dolphins on each face. One of these was found at Tivoli; probably all of both groups are Hadrianic or slightly later.

EPIGRAPHY

Two Inscriptions Referring to C. Iulius Bassus.

—In *Sitzungsber. bayer. Akad. Wiss.*, 1934, Heft 3, pp. 1-87 (fig.), ANTON VON PREMIERSTEIN discusses two inscriptions which treat of the chief events (including in these the *cursus honorum*) in the life of C. Iulius Quadratus Bassus. One of these is an important new inscription from the Asklepieion of Pergamum found by Th. Wiegand (*Abhandl. Preuss. Akad.*, 1932, pp. 39 ff.) and edited by Wilhelm Weber, who there deals in almost too great detail with Bassus as a client of the younger Pliny and as one of Trajan's generals. The other is an inscription from Heliopolis (Baalbek [*C.I.L.* iii, Suppl. 14387, d and 3]) which, owing to its fragmentary condition, has only recently been shown to refer to Bassus through the discovery of the above-mentioned Pergamene inscription. The author, following Rudolf Herzog, shows that Weber, through his supposition that the order of the *cursus honorum* has been reversed, makes errors in filling the lacunae and that he is wrong in identifying this Quadratus Bassus with a C. Antius A. Iulius A. f. Quadratus, a benefactor of Pergamum known to us in other inscriptions of Pergamum and Ephesus, the short form of whose name would have been A. Iulius. He is, furthermore, never referred to as Bassus. Herzog has also proven that this Bassus is the C. Iulius

Bassus, proconsul of Pontus Bithynia, and later (105 A.D.) *consul suffectus* referred to in Pliny's letters. An appendix discusses the date of Bassus' proconsulship and his trial for extortion. The author of the article is convinced that his arguments show that Mommsen's theory of the fixed chronological limits of the separate books of Pliny's letters is incorrect.

Inscription from Tusculum.—In *Jh. Oest. Arch. I.*, xxviii, 1933, pp. 140-163 (fig.), ANTON VON PREMIERSTEIN discusses afresh his reading of the fragment of an inscription found at Tusculum (Frascati) which he originally published in the *Jahreshefte der Österreichischen Archäologischen Anstalt*, Vol. VII, 1904, pp. 215-239, *Ein Elogium des M. Vinicius, Cos. 19 v. Chr.*, and which has been attacked, in several particulars by Domaszewski, Ritterling, A. Stein, Groag (who substituted P. Sulpicius Quirinius for Vinicius). His present article is entitled *Der Daker- und Germanensieger M. Vinicius (Cos. 19 v. Chr.) und sein Enkel (Cos. 30 und 45 n. Chr.)*. Though he accepts two changes from his original reading (Dacoru[m] for Quadoru[m] in line 5 (ad init.) and the spelling Vinu[ci]us in line 1) and admits that the lines were somewhat longer at the right than he had thought, thus permitting the base to be large enough for a life-size statue, he is still convinced that the reference is to the M. Vinicius who was consul in 19 B.C., and not to his grandson, consul in 30 and 45 A.D. Since the Vinicii would have been buried at their home in Cales, this Tusculan inscription was probably not a grave stele but a copy of an inscription in the Forum Augusti at Rome, where the statues of great generals were set up with inscriptions eulogizing their exploits. Groag and Stein have brought into the discussion a new inscription which mentions a M. Vinicius Septemvir (von Premierstein restores our inscription XVvir) who is, however, according to von Premierstein, the grandson of our Vinicius, consul much later (30 and 45 A.D.). That Augustus is not referred to as *Divus* fixes the date as anterior to 14 A.D. Such eulogistic inscriptions (*ornamenta triumphalia*) took the place after 12 B.C. of a formal triumph and were permitted only to men of consular rank. Among the consuls of Augustus' time are found six with gentile names ending in *-cius*, if we exclude L. Marcus Censorinus, consul in 39 B.C. and L. Vinucius, cos. suff. 33 B.C. as being too early, and two others on grounds that are quite convincing but too detailed to be here enlarged upon—namely three Sulpicii and three

Vincii. Since there is no room for the *cognomina* of the Sulpicii (the Vinicii were not thus distinguished), the author limits the possibilities to them and, on the basis of the chronology of events in Dacia and Pannonia, feels sure that the Vinicius who was consul in 19 B.C. is the one referred to here. An appendix treats of the offensive warfare of Augustus against the Dacians. (The Colonia Laus Iulia Corinthus with its Tribus Vinicia referred to in *A.J.A.*, XXIII, 1919, 167, n. 6; *R. Arch.* v, Ser. X, 1919, 399, n. 2; A. B. West, *Corinth, Results of Excavations*, viii, 2, 1931, is rightly referred to this Vinicius.)

SCULPTURE

New Statue of Perseus.—In *The Illustrated London News*, Oct. 27, 1934, p. 663, there is a picture of a new statue, recently found at Ostia. Although broken, it is almost completely preserved. It is a late Roman work, but it is important since it represents a hitherto unknown type.

Hounds.—G. RODENWALDT (*Jb. Arch.* I, xlviii, 1933, pp. 204-225) considers a number of representations of greyhound-like dogs whose ancient name was *Vertragus*. Both dog and name were Celtic. The monuments in the vicinity of Trier show a vigorous and natural style, unequaled elsewhere in the Roman provinces. Divers observations on ancient dogs and hunting are added.

AFRICA

The Collection Gaston de Vulpillières at El-Kantara.—In *Mél. Arch. Hist.* I, 1933, pp. 42-86 (2 pls. and 2 figs.), H. I. MARROU deals with a collection of antiquities made by M. de Vulpillières at El-Kantara. They throw light on the Roman roads in Africa and on El-Kantara, which was a garrison town and important station on the network of roads. The garrison in part consisted of Palmyrene archers. The inhabitants were partly Semitic and partly Berber. The population must have been rather large, and grain and oil were produced in considerable quantity.

Of especial interest are numerous reliefs relating to Saturn, who, according to Marrou, had a chthonic character and to whom a lamb or ram was sacrificed for the welfare of the dead, over whom the power of the god was apparently thought to extend. It is suggested that this Saturn was originally a Berber ram-god of the other world.

GREAT BRITAIN

Mediaeval Pottery.—R. NEWSTEAD publishes (*Liverpool Annals*, xxi, 1934, pp. 5-26) a detailed and fully illustrated study of a potter's kiln and potsherds found at Ashton, near Chester. All the discoveries belong to a short period in the fourteenth century. Thousands of sherds were found, most of them incorporated in the superstructure of the kiln. Thirty vessels have been reconstructed; nearly all are jugs, with considerable variety in form. Glaze of three colors was used. The ornament is stamped or incised, with comb-like implements, or applied in clay. The patterns are simple. Motives in groups of three or of seven occur in 21 out of a total of 22 decorated vases; this may have religious significance.

JUGOSLAVIA

Trebenishte.—N. VULIC (*Arch. Anz.*, 1933, pp. 459-482) reports on his recent work at Trebenishte. In 1932 and 1933 he found twelve graves of the sixth or fifth century in addition to the eight previously known. Two of them had heavy stone walls on the west side, though only earth on the other sides. Eight of the new graves yielded little. The others were fairly rich, chiefly in bronze; a Greek tripod is the best piece. In gold there were only a ring and eight pieces of decorated gold leaf. A town site was found 1.5 km. from the graves; it is 100 m. square; only walls have been found in it. A remarkable bronze statuette of a dancing maenad, presumably of the sixth century, is illustrated; it is said to have been found near Skoplje.

Basilica at Stobi.—In *Jh. Oest. Arch.* I, xxviii, 1933, pp. 112-139 (29 figs.) BALDUIN SARIA describes new finds in the ancient basilica at Stobi in Serbia. In the course of excavations, which make clear the original plan of the church, numerous interesting architectural members, such as capitals and bases of columns and pilasters, barriers, ambones, etc., were found and several decorative mosaics were uncovered, one with figures of birds and animals. Some Greek inscriptions, with the usual mistakes in spelling owing to iotacism, mention an early bishop of the church ('Ο ἀγιώτατος ἐπίσκοπος Φίλιππος), an archiereus, and an archdiaconos; a fragment of an imperial inscription refers to T. Αἰλ(ίου) [Ἀντωνεῖ] νο[ν] Σεβαστόν; a bilingual grave inscription in Latin and Greek (each supplementing the other) gives us the names of a soldier's family:

C. Sentius Saturninus, a veteran of the 4th Scythian legion, his son a pretorian guard, his wife, Iulia Gavia, and a freedwoman, Sentia Zosus. A number of paraphrases of liturgical phrases from New Testament Greek were found, such as ἐγὼ εἰμι τὸ ὄψωρ τὸ ζῶν, or ἐγὼ εἰμι ἡ πηγὴ τῆς ζωῆς.

POLAND

The First Congress of Polish Archaeologists of Prehistory.—Volume XII of the *Wiadomości Archeologiczne* (*Bulletin Archéologique Polonais*) is devoted to the papers read in the first congress of Polish archaeologists of prehistory in 1927.

DR. ZYGMUNT ZAKRZEWSKI discusses the dating of the graves of the Lusatian type with especial reference to the cemetery in Mechlin. He points out that the later graves vary greatly in type and he indicates eleven stages, some of which seem to be contemporary. Apparently the funeral urn tended to disappear quite early in the development. We find cases where only parts of the bones are in the urn and there is also variation in the disposition of the ashes and of the sand which is used in the urns. It seems that the custom grew up of placing the burned bones in the grave directly, and the urn itself disappeared before the ending of the custom of placing other vases near it in the grave. (*Wiadomości Archeologiczne*, xii, pp. 5-13.)

DR. STANISŁAW DEDIO reviews the possibilities for instruction in prehistoric archaeology in secondary and normal schools. He presses for the introduction of the subject and lists books and other materials that may be used for this purpose. (*Ibid.*, pp. 15-27.)

DR. KAZIMIERZ STOLYHWO discusses the differences between the *tori supraorbitales* of the Krapina and the Neanderthal men and he concludes that they developed in different ways from the Musterian period. (*Ibid.*, pp. 28-29.)

DR. ALEKSANDER MACIESZA discusses the studies of the late Leon Rutkowski and adds other material on the cranial forms of the population of Plock in the region of Mazovia during the early Middle Ages, especially the tenth to twelfth centuries. The majority of the skulls are dolichocephalic, but there is abundant evidence of the variation in racial types at that time, and we can see how the various routes through the province brought in different foreign influences. (*Ibid.*, pp. 30-39.)

DR. JAN CZEKANOWSKI outlines the possibilities

of mapping prehistoric remains and also the various dialects of Poland scientifically. (*Ibid.*, pp. 41-42.)

PROF. JÓZEF KOSTRZEWSKI discusses two cemeteries, one at Debrowko Nowe in Woelkapolska and the other at Warszkowo III in Polish Pomerania. Both cemeteries contain chest graves and seem to come from the Early Iron Age (Hallstatt C), and can be assigned to the Pomeranian culture. The author argues that this is the development of Lusatian culture, but he shows the similarity of it to the tumuli of East Prussia. He concludes that the points of similarity with the Scandinavian remains can be explained rather by Lusatian influence on the north, especially on Denmark, rather than the reverse. He believes that these cultures developed before the separation of the Balts and Slavs, and regards it as probable that the Pomeranian chest graves are the remains of a Baltic tribe which had advanced in the last period of the La Tène epoch westward and southwestward into the area from the centre of Baltic culture in East Prussia. (*Ibid.*, pp. 43-102.)

DR. ROMAN JAKIMOWICZ discusses the silver objects found among the Poles and the Western Slavs in general. He uses the Kufic coins found as a preliminary guide, but he goes beyond earlier scholars in treating the entire subject and not merely the coins. A study of the distribution of the Kufic coins reveals that they are more common along the Baltic than in the interior to the eastward, and he concludes that they therefore were not brought overland by the Arabs, but were brought by sea from Scandinavia and Gottland. With this basis he is able to divide the finds of coins and other objects into fifteen groups, which are quite distinct one from the other and which correspond to trading areas rather than to linguistic or cultural areas. He decides that the evidence for a purely Oriental origin of all these objects is not decisive, but he leaves the definite source of the objects still unconsidered. He has chiefly disproved the Arab theory of the movement of coins and objects and has transferred the agency of transportation to the Scandinavians. It is remarkable that in the tenth century Russia and Poland fall into different areas with a region between them, where few finds have been made. (*Ibid.*, pp. 103-138.)

DR. JÓSEF ZUROWSKI discusses the culture of pottery with radiating grooves on the basis of the excavations of the village of Modlnica in the region of Krakow. He connects this village with the

culture of Oeice-Opawa in Silesia as the northern branch of the Lengyel culture, the so-called Lengyel-Jordansmühl. Part of the material can also be connected with the culture of channeled pottery, but the vases of the two types vary in form. The author believes that we have a mixture of elements, but that the predominating influence came from the southeast and not from the north. (*Ibid.*, pp. 139-167.)

SPAIN

Niebla.—O. DAVIES, *Liverpool Annals*, xxi, 1934, pp. 29-36 (2 figs.), gives an account of digging at Niebla, in southern Spain. Pottery of the Neolithic, Bronze, and Iron Ages was found.

CHRISTIAN, BYZANTINE AND MEDIAEVAL GENERAL

Late Roman Buildings.—The meager evidence indicates that the Mausoleum of Constantine, in Constantinople, was a domed structure, round on the outside, with seven rectangular niches on the inside. The tomb of Honorius in Rome was very similar and perhaps imitated from it. Similar also is St. George at Saloniki, which was not designed as a church, since at first it had no choir, and is not contemporary with the arch of Galerius, since the bricks and ornament are different; it should belong to the later part of the fourth century, and may have been begun as a family tomb by Theodosius I. The octagon at Hierapolis, a sepulchral church of 400-450, is somewhat similar; its eight "niches" were open on the outside and so became entrances. (H. KOETHE, *Jb. Arch. I.* xlviii, 1933, 185-203.)

AFRICA

Two Inscriptions on Dolia of Christian Africa.—In *R. Arch.*, VI Série, iii, 1934, pp. 204-214 (1 fig.), W. SESTON discusses two inscriptions on African *dolia* which he dates toward the end of the fifth century A.D. He reads as follows the inscription on a *dolium* of Tingava: *ora pro qui fecit quia ad magis erunos iam novit et benefecit ora pro iscriptorem sic abes dm pro*, and gives a commentary. He would relate this inscription and another on a *dolium* from Hammam-Lif (*In ipse Dei pascas*) to the Christian emphasis on charity to the poor and the reward in heaven for benefactors. He suggests that both *dolia* may have been made for the church in order to hold wine, grain or oil for the poor.

PALESTINE

Early Synagogue Architecture.—Features of the recently discovered Dura Synagogue which mark it as more primitive and more indigenous to Jewish religious life than any of the synagogues found in Palestine are pointed out by PROF. C. H. KRAELING in *B.A.S.O.R.* 54, pp. 18-20: (1) its more natural orientation—the façade towards the east, making no awkward change of position necessary when in prayer, as was the case in the Palestinian synagogues where the worshipper had to turn back towards the door by which he had entered; (2) the more logical position of the place for ablutions—at the front of the synagogue at Dura, at the side in Palestine; (3) the absence of a gallery for women worshippers at Dura—apparently this custom had not yet come into vogue; (4) its closer resemblance to the specifications for the Wilderness Tabernacle. May all this not indicate that the origin of the synagogue is to be found in the Diaspora rather than in Palestine?

The Site of the Akra.—In *R.B.* xliii, 1934, pp. 205-236, R. P. VINCENT subjects the vexed question of the site of the Jerusalem Akra to a fresh examination. He discards the evidence of Josephus as untrustworthy. In the "*War*," where Josephus has no Jewish sources at hand for the ancient topography of the city, he vaguely identifies the Akra with the Lower City. In the "*Antiquities*," where he is relying on *I Maccabees*, he knows that the Akra is the fortress built by Antiochus Epiphanes, but he still places it in the Lower City. Vincent examines the possibility of a site in the Lower City. To the north of the Temple is the site afterwards occupied by the Antonia, but if the Syrians held this Judas would not have been able to regain and purify the Temple. There is no site to the west except across the Tyropoeon, and thus outside the limits of the Lower City. To the south (and here Josephus evidently considered it to be) no site is high enough to dominate the Temple. It is true that Josephus has a story (*Antiq.* xiii, 6, 7) that the Akra and the hill on which it stood were both levelled to the ground by Simon, but the story has all the marks of being a fiction and is in flat contradiction to *I Macc.* xiv, 37, which states that Simon repaired it. The evidence of *I Maccabees* (written not more than 25 years after the capture of the Akra) alone is trustworthy. Here we are told that the Akra was "over against" the Temple, and that it occupied

the site of the "City of David." But this cannot be the original "City of David" in the Lower City which was 38 to 40 m. lower than the Temple (Josephus himself has David *mounting* from his palace to the site of the future Temple, *Antiq.* vii, 13, 4) and too far away (180 m.) to be described as "over against" the Temple. We seem justified in assuming that just as the name "Zion" migrated from the ancient Jebusite stronghold to the Temple area, so the name "City of David" had also shifted to the new and loftier citadel which adorned the growing city. This new "City of David" must be found on some special eminence of the high western hill, yet without pass-

ing beyond the limits of the city ruined by Antiochus Epiphanes. Three possible locations are discussed: Golgotha, the site afterwards occupied by the Hasmonean palace, and the site of the later Herodian palace. If Golgotha had been the site of the Akra, Jonathan would have been unable to restore the *χαφειναθά* (*I Macc.* xii, 37), which Vincent identifies with the "Second City." The site of Herod's palace is too far from the Temple. We are left with the promontory northeast of the Upper City, rising a dozen metres above the Temple area and separated from it by the Tyropoeon. This site meets all the requirements of our texts.

NEWS ITEMS FROM ATHENS

Athens itself was the center of a considerable amount of archaeological activity during the winter and spring of 1934, for, in addition to the excavations in the region of the Athenian Agora by the American School and the Greek Archaeological Department, the German Institute was continuing its work in the Kerameikos. Mr. Aristophron was extending the area of his investigations on the site of Plato's Academy and Mr. Homer Thompson carried out a final campaign on the Pnyx.

In the Kerameikos Mr. Kraiker continued his excavation of the graves in the lower strata of the region of the Dipylon Gate and the Pompeion.¹ The number of Sub-Mycenaean graves was increased during the digging of the fall of 1933 to a total of one hundred and two. The accompanying pottery, amounting to ninety vases in all, has now been set up in the Kerameikos Museum together with the objects from the Protogeometric graves. The extent of this necropolis toward the east was determined by excavations in the court of the Dipylon Gate, where a grave immediately in front of the entrance to the northern gateway yielded a lekythos of the latest type of vase found in this cemetery, one which, in fact, could be called Protogeometric. This substantiates the inference that the latest graves lay on the east, their limit evidently marked by the edge of the deep layer of red earth which becomes shallower following the rise of the rock in which the foundations of the eastern Dipylon wall are cut. In front of this wall were found hewn in the rock several rectangular pits which perhaps should be regarded as early Geometric graves. These had been completely emptied in ancient times. Supplementary excavations toward the west between the exterior walls of the two Pompeion structures and beneath, as well as in front of, the City Wall of the fourth century showed that the Sub-Mycenaean cemetery continued farther in this direction. In the beginning this appeared to have been laid out according to a regular plan, as were the earliest graves under the west colonnade of the Greek Pompeion, but the later graves were placed irregularly without any formal arrangement like

¹ For this report I am indebted to Dr. Karo, the Director of the German Institute, and to Mr. Kraiker, the excavator of this region.

those toward the east. The boundary could not be exactly determined here because of disturbance and construction in ancient times. It may be assumed however that it continued in use as a cemetery in Protogeometric and Geometric times and that the masses of sherds used as filling in the erection of the high grave mound on the Sacred Way (*A.A.* 1933, pp. 261 f.) came from this region. Trial pits in the circular building west of the City Wall have not yet given any confirmation to this inference, but at the west end of the City Wall Protogeometric and Geometric urn graves were found above Sub-Mycenaean ones.

Eleven Protogeometric urn graves have so far been excavated. Two of these were dug in this year's campaign—the first, an interment in a two-handled hydria with a simple striped decoration on the shoulder (Ht. 0.34 m.). This was found immediately to the east of the Protogeometric double grave. The hydria contained a bronze javelin point (0.19 m. long) and an iron dagger (0.2 m. long) with a bone handle. A bit of the rotted linen sheath is still preserved on the blade of the dagger, showing clearly the fine weave of the linen.

Under the west end of the outer part of the wall, close beside the incineration grave III, was found an interment in an amphora (0.535 m. high) which bears on its shoulder between concentric half circles a broad band of net pattern as its main decorative motif. Turned down over it was a saucer made of coarse clay (Ht. 0.14 m., D. 0.27 m.). Under this in the mouth of the amphora lay a one-handled cup of early Geometric style (Ht. 0.066 m.). The interment consequently must date from the transitional period between the Protogeometric and the Geometric style.

Protogeometric pottery is richly represented in the great masses of sherds from the grave mound on the Sacred Way (*A.A.* 1932, p. 191; 1933, p. 261) which has now been almost entirely removed. They form a welcome addition to the urn graves and substantiate the view that in Athens a cultural independence and continuity persisted from Late Mycenaean to Geometric times, since the Late Mycenaean tradition was preserved, leading through a slow and extremely logical development from the vessels of the Sub-Mycenaean cemetery

right on to an entirely new style which can most suitably be called the "clay-ground" Geometric style. This latter possesses in its full development all the essential characteristics of the later Geometric style—the Greek shape, the exclusively linear ornament, the tectonic function of the decoration on the wall of the vase which is regarded and treated as a unit, the same clay and the same glaze. Through the transition from the "clay-ground" (Protogeometric) to the "black-ground" treatment of the vases, arises, in Athens, the Geometric style of the so-called "black Dipylon" vases which consequently might better be called "black-ground" Geometric style. In the same manner, four hundred years later in Athens, a new style arises through the change from black-figured ("clay-ground") to red-figured ("black-ground") decoration of the vessel.

Four early Geometric graves were also found. An interment from the period of transition had been inserted in front of the west end of the City Wall in the earth fill of a Late Mycenaean burial containing a late stirrup-vase. In an irregular pit about 0.70 m. across stood an amphora in the earliest "black-ground" technique, beside it, a two-handled hydria in the latest "clay-ground" Geometric style. These pots had been crushed by the installation of a cremation grave of the seventh century, the bottom of which ran immediately over them and took off the neck of the hydria. The burned bones of the dead lay in the amphora, among them two badly destroyed small fibulae of iron and a small bronze pin. A second similar pin was found outside in the pit and this led the excavator to consider it as the grave of a woman. The amphora has been put together completely (Ht. 0.495 m.). It has a looped handle, a specially emphasized decoration on the shoulder consisting of a rectangle with meander pattern, a lid with crossed handles and a conical base. The shape has an exact parallel in a vase from a Protogeometric grave found by Kübler in 1932 (*A.A.* 1932, p. 196, Figs. 8 and 9). The decoration there is already "black-ground," only the shoulder being decorated with concentric half-circles on the clay ground. The hydria has also only a single motif on the shoulder—three squares in a row, set angle to angle. In these squares are smaller squares bordered by three lines. At the base of the neck runs a glazed stripe from which hang down groups of dashes, a last linearized conception of the common necklace

motif of Sub-Mycenaean vases. It no longer has, however, the wavy band in the handle zone. This is probably the latest vase in the Protogeometric style from Athens. Not far from this grave, in the City Wall itself, lay a rectangular ashpit (0.15 m. deep, 0.97 m. long, 0.55 m. wide). In it were found burned bones and fragments of a small black glazed cup (Ht. 0.09 m.) with a high Protogeometric conical foot and an Early Geometric zigzag on the offset run. This is a remarkable shape for the period of transition. Furthermore, it contained a long narrow sword blade of iron (0.47 m. long). The blade, which is worked at the top for fastening the handle, has three rivets preserved. Traces on the rusted blade show that the sheath had been made of wood.

Nearby, under the outer edge of the City Wall, was still another Geometric urn grave which, however, had been almost entirely destroyed by a burial of about 600 B.C.; only the lower part of an Early Geometric amphora containing burned bones was still preserved. Upon it lay a bronze dish, like the one from the warrior grave, which had presumably formed the lid of the amphora. The remaining pot sherds, along with many others, mostly Protogeometric, which did not belong, had become mixed into the fill of the later burial. It was, therefore, not possible to determine with certainty what other vessels belonged to the urn grave. Two Early Geometric saucers and a beautiful plate (D. 0.195 m.) were pieced together. Also a fine bronze pin must belong to the urn burial.

Directly in front of this again was a rich warrior grave dating from the earliest Geometric period, placed in a regularly cut pit (0.75 x 0.60 m.). In the fill about the vases were still ashes from the pyre and the remains of an iron lance point and an iron sword blade, both, unfortunately, so badly damaged by rust that their shapes could no longer be exactly determined. The bone ashes were deposited in a magnificent amphora (0.72 m. high), the shape of which is developed out of the Protogeometric amphoras (cf. *A.A.* 1932, p. 206, Fig. 12; 1933, p. 278, Fig. 14). It was covered by a bronze dish, without handles or foot, several examples of which have now been found in the Kerameikos. The other accompanying objects consisted of a small amphora (Ht. 0.386 m.), a jug with meander squares on the neck (Ht. 0.27 m.) which rested on a beautiful tripod (0.192 m. high), a two-handled dish (0.08 m. high) and a one-handled cup completely glazed (0.055 m.

high). This cup corresponds to the one from the Protogeometric grave, with the "clay-ground" amphora. There was also the foot of a glazed jug—the grave had been disturbed by ancient digging.

Later Geometric graves were also cleared. The west end of the urn grave from the period of transition was intersected by a broad trough-like pit 0.70 m. long and 0.50 m. wide which was filled to a depth of about 7 cm. with ashy earth, bits of charcoal and burned bones. In this fill lay burned remains of a small pyxis with a lid (Ht. without lid, 0.037 m.). On this evidence the grave seems to date still from the first half of the ninth century. In the fill of ashes lay, furthermore, a sphere of clay with incised patterns and a hole bored through it, a type of object often found in Geometric graves. Above this pit lay a fill of red earth, 0.03 m. deep, upon which rested, diagonally, an inhumation grave containing a very badly destroyed skeleton with head toward the south. This burial had been made in a pit 1.80 m. long, 0.45 m. wide and c. 0.62 m. deep which had been covered with stone slabs. Field stones had been piled on the cover slabs. Beside the head of the skeleton had been laid a Late Geometric stemmed cup. Some fragments of the lid were found in the fill of the incineration grave alongside, which had cut into the burial at the west corner.

Under the north corner of Room S of the Greek Pompeion (*Ath. Mitt.* 53, 1928, Beil 34) a large grave of the developed Geometric period came to light. In a pit (2.10 m. long, 0.90 m. wide, and 1 m. deep) in the south corner, the bone ashes had been deposited in a bronze urn with a diameter of ca. 0.29 m. across the rim. The urn has been almost entirely destroyed by the dampness, but the rim and the remains of a lead lid above it, as well as the dented bottom, were still preserved. It has a sharper profile than the one found in 1927 (*Ath. Mitt.* 51, 1926, p. 139). It rested upon a terracotta tripod with metope decoration (Ht. 0.32 m.). Leaning against the urn was an amphora of a curiously slender form (Ht. 0.52 m.); beside it was a jug (Ht. 0.21 m.) with trefoil mouth, black glazed up to the shoulder which is decorated with upright arcs at regular intervals. Opposite this toward the west corner of the grave lay three saucers and a pyxis. Two of the saucers (Ht. 0.102 and 0.097 m., D. 0.15 m.) are similarly decorated with upright loops above cross-hatched cores in metopes between groups of three and four dashes. The other saucer shows in concentric

composition a cross-hatched square and on either side a metope with birds between rosettes. The other side of the vessel had three such bird metopes. (In *Ath. Mitt.* 1933, p. 100, Fig. 41, Mr. Eilmann discusses this saucer). The most beautiful vase from this grave is the pyxis (Ht. with lid, 0.12 m., D. 0.165 m.).

Incineration graves of the seventh century were also discovered. Above and beside the grave at the west end of the City Wall were four incineration burials. As usual they had no accompanying objects and their shape with two cross trenches is that peculiar to the seventh century, as the excavations of Mr. Kübler have again confirmed (*A.A.* 1933, pp. 266, 267, Fig. 2, left and above). In front of the City Wall two (I and II) were by accident made to overlap graves of the ninth and tenth centuries. Another farther to the west (III), likewise made over a Sub-Mycenaean grave (B), had cut away the south end of a Late Geometric interment (3) and contained in its fill fragments of the lid of the stemmed cup from that grave. Furthermore, among the bits of charred wood there was still preserved a piece of a band or belt woven of thick cord. All these graves were oriented SE-NW. In the City Wall and partly under its outer shell lay an incineration grave oriented NE-SW, likewise without accompanying objects, close beside another grave with the same orientation found in 1932. All the incineration graves contained charred remains of wooden beams, often still with the thickness of the original tree trunk, upon which the dead had been burned in the grave as the ashes of the bones indicate. Under the outer shell of the city wall there was a child burial that could be dated to about 600 B.C. by a small Corinthian skyphos and sherds in the earth filling. It had damaged the urn grave mentioned above. Nearby, above it, were remains of a coating of poros with traces of the burning of offerings, perhaps belonging to one of the incineration graves of the seventh century. Such traces of burning were lacking for all the other graves here as well as the offerings themselves. They may have been destroyed by the intensive building activity in ancient times. Noack's excavations in and along the City Wall reached a depth of only 1.30 m. and so left untouched this whole important group of graves. Trial trenches along the City Wall farther to the east up to the Dipylon Tower T, revealed a few more Sub-Mycenaean graves, among them one previously discovered by Noack, but they

showed that the excavations of the Greek Archaeological Society which was so rich in finds (*Πρακτικά*, 1874, p. 17) reached a great depth and removed everything, so that further digging in this region would scarcely be profitable.

The excavations of Mr. P. Aristophron on the site of the Academy of Plato are becoming more important. Since last year the five small excavations to the S, SW, W, and NW of the gymnasium have remained unchanged. The gymnasium, however, has now been cleared almost to the archaic level. It appears to have been an archaic building much older than all other hitherto known gymnasia. The ground plan is not yet square (somewhat over 40 x 24 m.). Around a rectangular court were long narrow rooms with interior supports. Unfortunately, everything is very badly damaged. Northeast of the main building a trial trench uncovered an archaic wall of large slabs on a foundation or core of small field stones, obviously a part of the entrance from the street, on which last year the sarcophagi and much older altars came to light. Under that entrance were found beautiful Geometric bronze vessels, and under the archaic gymnasium also was found a Geometric layer and then hardpan. Toward the southwest, where, some 60 m. distant, many walls, probably belonging to the gymnasium, were found in trial trenches, there lies at a greater distance a Geometric cemetery that belonged to the old Demos.

At a considerable distance to the northeast, Mr. Aristophron last year found the massive foundations of a colonnade and interpreted it as the *Peripatos*. This still remains a problem, since no trace of a wall has been found in association with the row of columns. Scanty traces of a small early temple came to light toward the north. To it belong the remains of a roof of terracotta which date probably from the third rather than the last quarter of the sixth century. The metope with the stag had been enlarged by a piece fitted in, bearing the body of the huntsman; folds are recognizable in his chiton. This region also produced two important inscriptions, one, a stele dedicated to Hermes by Thebaïos of Alopeke after he became phylarch, and the other a tiny splinter of marble of the fifth century with the names of four Platonians. In spite of its small size it is the most important thing discovered on this site.

During the summer of 1934 for a period of five weeks, exploration was renewed on the Pnyx Hill under the joint auspices of the American School

of Classical Studies and the Department of Antiquities of the Greek Government, supported by a grant from the American School. Attention was divided between work of conservation in the Assembly Place proper, the further examination of the sanctuary discovered on the hilltop in 1931 and a preliminary investigation of the city wall that passes along the top of the ridge. The work was directed by Mr. Homer Thompson of the Agora Staff.¹

"In the Assembly Place the thin covering of soil that overlay the rock-cut part of the earliest seating-floor was removed and the terrace along its front was cut down approximately to its original level so that the visitor may now gain a very fair notion of the meeting place of the Athenian assembly in the fifth century B.C. The surplus earth was used to build up restoration sections in the wings of the latest auditorium, to the height indicated by the remains themselves, of the sloping seating-floor of the second century A.D. Elsewhere in the area of the Assembly Place old exploratory trenches were filled in and retaining walls built to assure both the convenience of the visitor and the preservation of the remains.

"In the upper area the foundations were cleared of a building, measuring ca. 17.5 m. wide and 66 m. long, that crowned the very crest of the hill immediately to the south of the Assembly Place. It would appear to have consisted of a single long room with continuous back and front walls and with a broad colonnade rising above three steps along its entire front. This porch commanded a magnificent view of the Acropolis, city and Attic plain. Sherds from the filling used to level the area for the structure suggest for it a date not earlier than late Hellenistic or early Roman times. This building is in all probability to be associated with a sanctuary, traces of which have been found in the shape of numerous little votive cups and terracotta figurines. The character of the figurines points to a sanctuary of Demeter; the prominence of the site and its proximity to the Assembly Place agree admirably with what we know of the sanctuary of Demeter Thesmophoros, the scene of the autumn festival of the Thesmophoria and of Aristophanes' *Thesmophoriazousai*. The long building may conceivably have sheltered the Athenian ladies who spent the nights of the festival on the hilltop.

¹ For this report I am indebted to Mr. Thompson.

"After this building had been dismantled, a line of city wall in excellent ashlar masonry was carried along the foundation of its back wall. This length of city wall, which joins the Hill of the Nymphs with the Hill of the Muses by passing along the crest of the Pnyx range, had previously been partly visible and had long been regarded as

a part of Kleon's Crosswall (Diateichisma). At a later time (probably not earlier than the fourth century A.D.) the city wall was repaired and towers added, built largely of re-used blocks bedded in mortar."

ELIZABETH PIERCE BLEGEN

ATHENS, GREECE

BOOK REVIEWS

EARLY FORERUNNERS OF MAN—A Morphological Study of the Evolutionary Origin of the Primates, by W. E. Le Gros Clark. Pp. 296, 89 figs. William Wood and Co., Baltimore, 1934. \$5.00.

In order satisfactorily to study the specific problem of Man's phylogenetic origin the author believes it is essential to visualize in proper perspective the development of the whole group of Primates of which he is but one member. We can thus best "note the trends of evolutionary development which became manifested in the early generalized Primates and, by following them up, recognize which particular trends led to the line of evolution which culminated in Man." This is to study the origin of Man in prospect rather than retrospect. This method of approach would seem to lead to a more accurate assessment of the real zoological position of Man than would a method which relies chiefly on a direct comparison with those modern apes which most closely resemble him in anatomical structure. The author hopes that his work may form an introduction to the study of Mankind from the morphological aspect and that it may be particularly serviceable to those specialists who are compelled to limit their researches to the structure of the human body without particular reference to comparative anatomy.

After the Introduction the author discusses the distribution of Primates in space and time; he then traces their evolutionary origin by marshalling in turn the evidence furnished by: (1) the skull, (2) teeth, (3) limbs, (4) brain, (5) special senses, (6) digestive system, and (7) reproductive system. He concludes that the living members of the Order Primates must be recognized as the very few survivors of a whole series of evolutionary radiations which diverged *ab initio* from an extremely generalized stock of placental mammals and which incorporated quite wide potentialities for specialization in diverse directions. Many of the various sub-divisions of recent and fossil Primates which have been recognized as different families or genera may conceivably be polyphyletic in their ultimate origin, and it is possible that a more extended palaeontological record

may necessitate the creation of more than the three sub-orders now recognized.

The general evolutionary history of the Primates may be conceived somewhat as follows: Toward the end of the Jurassic or the beginning of the Cretaceous period, a basal stock of generalized placental mammals emerged and formed the foundation for the subsequent differentiation of all the various Orders of eutherian mammals which are to-day known. In the initial splitting up of the basal placental stock, a group of generalized mammals appeared which were endowed with, or acquired, potentialities for developing in the particular direction which led ultimately to the appearance of the Primates.

From the basal Primate stock there developed the three sub-orders: Lumuroidea, Tarsioidea and Anthroidea. The line of evolution of the Anthroidea has been marked by the successive branching off of specialized groups from a central stem in which a progressive expansion of the brain has been accompanied by the retention of a bodily structure of a remarkably generalized type. This main stem culminated in the appearance of Man himself. In the phylogeny of the Primates parallel evolution has played an important part; it has been a much more common phenomenon than is usually recognized. The author believes the instances of parallelism in the evolution of the Primates cited by him are to be interpreted satisfactorily only by the conception of definite predetermined trends of development—that is by the conception of Orthogenesis. This conception puts the onus of evolutionary progress more on the germ plasm and regards the influence of environment as of somewhat secondary importance.

The work is a major contribution to our knowledge of Man's ancestry and is singularly free from misstatements of fact. The statement on page 24 that Dubois discovered *Pithecanthropus erectus* in 1898 is probably a typographical error. The discoveries were made in 1891 and 1892. The volume is appropriately dedicated to Professor (now Sir) Grafton Elliot Smith.

GEORGE GRANT MACCUDY
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CHILDREN OF THE YELLOW EARTH—STUDIES IN PREHISTORIC CHINA, by J. Gunnar Andersson. Translated from the Swedish by E. Classen. Pp. 345, 32 pls., 147 figures in the text and 1 map. New York, The Macmillan Co., 1934, \$6.50

Fifteen years ago, practically nothing was known of the prehistory of China. Andersson's part in what has been done since then is a major one; no one has a better right to speak with authority, since many of the discoveries chronicled are his own. He is Curator of the Museum of Far Eastern Antiquities in Stockholm. He began his work in China as a mining expert, turned fossil collector and then developed into an archaeologist.

The author's connection with the discoveries in the cave of Chou K'ou Tien, south of Peiping, has been intimate from the start and he rightly devotes considerable space to these, agreeing with other authorities that *Sinanthropus pekinensis* is a type of man dating from the Early Pleistocene, that he was a chipper of stone tools and made use of fire, also that his foot was of a more primitive type than his hand.

The author describes the important finds made by Licent and Teilhard west of the Ordos at Choei Tung Kou and on the southern border of the Ordos at Sjara Osso Gol, the latter in a basin in which dune formations alternated with lake deposits and the former in typical loess. The artifacts from both sites are of the Mousterian Epoch. Faunal remains are especially abundant at Sjara Osso Gol. Mention is also made of the discovery by Teilhard and Young of traces of Palaeolithic man in the valley of the Yellow river between the provinces of Shensi and Shansi.

Andersson describes his own discoveries of a late Stone Age and early Metal Age culture in Honan at Yang Shao Tsun. The artifacts include axes and adzes of stone; arrowheads of stone, bone and shell; awls and needles of bone; stone and pottery spinning whorls; and especially pottery vessels, both unpainted and painted. The painted pottery is comparable with that from Anau, Russian Turkestan.

The cave of Sha Kuo T'un in southwestern Manchuria was excavated by the author in 1921. He believes it to have been a cave, where human sacrifice formed part of a cult. In addition to parts of 45 human skeletons, the deposits yielded artifacts of stone and shell, as well as pottery, objects that were symbolic rather than of practical use.

The prehistoric crescent shaped stone knives of northern China are traced to the territory of the North Asiatic Chukchi, as well as to the North American Eskimos. Knives of this type, but made of iron, are still in use amongst these two Asiatic peoples. The author also traces the evolution of the modern iron scythe back through the bronze scythe to the large Neolithic stone knives without handle. He likewise draws attention to a type of stone celt, which may be the prototype of the Chinese socketed celts of metal.

Ranking with the type station of Yang Shao Tsun in Honan is the Neolithic station of Ma Chia Yao in the T'ao valley, Kansu, excavated by the author in 1924. The P'an Shan district, with its cemeteries rich in burial urns, like the T'ao valley, is one of the foremost fields for prehistoric research in the world. One whole chapter (XX) of the book is devoted to "The Symbolism of the P'an Shan Graves." The meaning of the Yang Shao Civilization is explained in the final chapter.

GEORGE GRANT MACCURDY

OLD LYME, CONNECTICUT

SEVENTY YEARS IN ARCHAEOLOGY, by Flinders Petrie, Kt. Pp. 307, 25 pls. London, Sampson Low, Marston and Co., Ltd., n. d. 18s.

Sir Flinders Petrie's story of his half century of work in Egypt and Palestine is full of the flavor of the man, of his enormous energy and industry, his courage, and his tenacity of purpose in carrying on in the face of obstacles both physical and moral. Like other men of unusual ability and force Professor Petrie has not always found it easy to agree with his adversaries, but while he may not invariably in the past have followed the resolve of the psalmist and kept his mouth as it were with a bridle, nevertheless, thus far, he has rarely relieved his feelings in print. He has been a sturdy fighter and not the least piquant portions of his narrative are those dealing with his relations with the Antiquities Service of Egypt and with the Egypt Exploration Fund (later the Egypt Exploration Society) in England. Foreigners are put in their places and the sins of individuals are visited upon their respective races. Even Englishmen do not escape unscathed, some being named while other sinister influences will easily be identified by the informed reader.

There may be others who have explored Egypt as thoroughly as Petrie has, but no one else can have carried on excavation at so many different

places. He seems to have worked for a shorter or longer period at about 50 sites, and has visited many others. While this method of procedure is not of itself a virtue, it well illustrates the Professor's restless energy. Certainly it gave him a variety of experience that cannot be equalled by that of any other excavator in Egypt.

It is interesting that his first work in Egypt, beginning in 1880, was inspired by Piazza Smyth's "Our Inheritance in the Great Pyramid." Piazza Smyth had been a friend of both Petrie's grandfathers and of his father, but Petrie's more accurate measurements were destined to destroy Smyth's extraordinary edifice, at least in the minds of most intelligent people.

The author records a good many rather shocking facts in regard to the administration of the Antiquities Service in his early days in Egypt and some relating to days not so long gone. He also mentions instances of extraordinary carelessness on the part of persons to whom antiquities were entrusted for examination. Thus 228 demotic papyri from Tanis seem to have vanished into thin air and have never been found or published (p. 51) and iron tools from Naukratis could be thrown away by an important European museum (p. 56). Two large and perfect land deeds of Byzantine time from Hawara were deposited in a great university library for safe-keeping 45 years ago and since then have not been found. It was at Naukratis that Professor Petrie identified the first foundation deposits. On p. 100 the author seems to claim that a foundation deposit of S'en-Wosret II found by him at el Lâhûn is still the earliest yet known. But deposits of Amen-em-hêt I, were found by Mace for the Metropolitan Museum at Lisht in 1908 and 1921 and were published and illustrated by him in the Bulletin of that Museum for October 1908 and November 1921 (Part 2). Since Petrie's MS. was completed Lansing has found at Lisht deposits of S'en-Wosret I.

In 1889, apparently, began the legend of the sprouting of ancient seeds found in tombs when planted in modern times. The story arose in connection with grain taken from sarcophagi presented to the Prince of Wales (later Edward VII) by the Khedive, but the coffins had lain for some time in the Khedive's stables covered with modern grain! Similar tales are reported from time to time and the legend will not down.

Petrie did a season's work in Palestine as early as 1890 and found conditions there less agreeable

than in Egypt and the natives not such good workers as the Egyptians. While there he had several encounters with robbers. The next season he returned to his work in Egypt, and in 1891-92 began at El 'Amârneh. Here he made his famous discoveries of painted pavements and walls and took the greatest pains to preserve them, only to see the beautiful pavement completely destroyed some years later through lack of foresight on the part of the Egyptian Antiquities Service. The Professor's descriptions of the techniques which he developed for special circumstances are of much interest, as are his references to his methods of dealing with his workmen and his Egyptian neighbors.

Professor Petrie has always believed that the results of a season's work should be published promptly and this principle he has followed consistently throughout his career. Every autumn after getting through the difficulties connected with dividing his excavated material with the Egyptian Antiquities Service at the end of the season, shipping it to London and unpacking it for exhibition, he sat down and wrote a book about the previous winter's dig. Often his only holidays were his journeys to and from Egypt and sometimes his work on his books was continued on the voyage to Alexandria. Thus he has written or collaborated in about 90 books, over 60 of which represented his sole authorship. About 60 of the volumes are archaeological reports and about 30 were historical, or descriptive of particular classes of material. Beside this he founded in 1914 and conducted his own journal *Ancient Egypt* (now *Ancient Egypt and the East*), often supplying most of the articles as well as the editing, and writing the book notices. His archaeological reports naturally suffered from the pressure under which they were produced. Many problems could not be solved in one season and proposed theories might have to be abandoned. But the record was there, with plans and photographs.

In 1894 figures found by Petrie at Koptos were declined by the British Museum as "being un-historic rather than prehistoric." They went to the Ashmolean at Oxford instead, and so did much other material then and later. The following season Professor Petrie excavated at Nakâdeh the great pre-dynastic cemetery with its types of pottery and other objects now so familiar. In 1895 he found the great stele of Amen-hotpe III on the back of which Mer-en-Ptah had engraved the record of his victories, including among his vic-

times the tribes of Israel, a name which Petrie recognized in its hieroglyphic form. Petrie believes that Mer-en-Ptah was the Pharaoh of the Exodus. In 1896 at Dishāsheh near the entrance to the Fayyūm he found the well known Old Kingdom tomb relief showing the siege of a city.

The bits of scandal are not all confined to Egypt or to Egyptology, for Petrie was told that the hiding place of the treasure of Becket's shrine at Canterbury was apparently discovered by a corrupt clerk of the Works, it would seem as late as the 19th century, and disposed of secretly.

The Professor clings to his personal method of transliterating Egyptian words and proper names. For example, the Egyptian consonant corresponding to semitic 'ayin is regularly rendered by the vowel o.

Petrie records numerous instances when the greatest pains were taken in his excavations. At Abydos in 1902 he found the remarkable little ivory figure of King Khufu of the IV Dynasty, under three inches in height. The head was broken off and lost during excavation and Petrie had earth sifted for three weeks until the head, $\frac{3}{8}$ of an inch high, was recovered.

The Professor has a high regard for the Copts, their cleanliness and civilized behavior. He goes so far as to say that "Egypt will never be a civilized land till it is ruled by the Copts—if ever"; and "all the sound men in office whom I have met are Copt or Albanian or Tunisian."

In referring to his work at Athribis in 1908, Petrie reaffirms his belief that the dynastic Egyptians came from Punt across the eastern desert to Koptos, bringing with them the god Min. There is no question, of course, that Min has eastern associations. Evidence of the presence of foreigners at the opposite end of the Egyptian story was supplied by Petrie's extraordinary finds at Memphis of terracotta heads of foreigners from countries running right across Asia and Europe from India to Spain. These appear to belong to the Persian period.

From the outbreak of the great war Petrie was held in England five years. During these years he wrote nine of his volumes on different classes of material in his large University College collection. These have since been published and there are other catalogue volumes finished but not issued. Since 1926 Professor Petrie has been excavating in Palestine. Now over 80, he continues to carry on the work to which he has devoted himself for nearly three-quarters of a century.

In this book Professor Petrie uses a chronology for the periods before the New Kingdom which is followed by no one else so far as we know. While in 1929 and 1931 he made modifications of his very high dates for the earlier periods he retains in this book much higher dates than are accepted by most scholars for the Old and Middle Kingdoms.

The book makes no pretense to a literary style, but it is full of interest and of the revelation of a remarkable and attractive personality. There are a few slips in spelling, such as the double plural *Ulemas* on p. 49. One can only regret that the plan of the book prevented the inclusion of more details of Professor Petrie's personal life and of his interests other than Egyptological, of which he has many. These are only hinted at here and there.

LUDLOW BULL

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New York

UR EXCAVATIONS, Vol. II: THE ROYAL CEMETERY. A REPORT ON THE PREDYNASTIC AND SARGONID GRAVES EXCAVATED BETWEEN 1926 AND 1931, by C. Leonard Woolley, with chapters by Rev. E. R. Burrows, Sir Arthur Keith, Dr. L. Legrain, and Dr. H. J. Plenderleith. (Publications of the Joint Expedition of the British Museum and of the Museum of the University of Pennsylvania to Mesopotamia.) Text, pp. xx+604 with numerous figures and charts. Plates, pp. xiii+274 pls. London, British Museum, Bernard Quaritch, Oxford University Press, etc., and Philadelphia, the University of Pennsylvania Museum, 1934. \$20.00.

With this monumental work the coöperating institutions and the excavator have fittingly inaugurated the definitive publication of the archaeological remains from Ur. The first volume of *Ur Excavations* appeared in 1927, and was devoted to the publication of the excavations at al-'Ubaid near Ur. In 1928 followed the publication of the royal inscriptions found up to that time in the Ur excavations. Thanks to the generous assistance of the Carnegie Corporation it has been possible to print the two volumes before us in a way commensurate with the importance of the contents. Nearly forty sumptuous color-plates add immensely both to the beauty and to the usefulness of the work.

When the reviewer is confronted with so admirable a publication as the one before him, he is tempted to indulge in unrestrained praise. One

can only be thankful for so great a mass of new material, of equal value to the Assyriologist and to the comparative archaeologist. Moreover, the quality of the text is worthy of the elegance of its presentation. Since quality of material and luxury of publication do not always coincide, it is very fortunate for the archaeological world that this is the case here.

Dr. Woolley's long experience and training in method guarantee the general correctness of the archaeological data in the first volume, so we may refer with confidence to the details which he gives in over five hundred pages by his own hand. It does not necessarily follow that his interpretations are all correct. Since his views have been vigorously opposed by a number of scholars at several important points, we shall consider his counter-arguments with particular attention. On page 32 he divides the 1850 early graves which he examined in the five years 1926-31 into four groups, as follows:

- I. Early or Predynastic (including all the royal tombs).
- II. Graves with partly cremated bodies, "First Dynasty."
- III. A group of fifteen graves, "Second Dynasty."
- IV. Sargonid Cemetery.

In Chapter IX (pp. 208-27) Woolley discusses the dating of those four groups of burials. The relative chronology which he gives, may now be considered as established, and the objections raised by Christian, in particular, must be regarded as invalid. Woolley's absolute chronology remains, however, much too high, in the opinion of most scholars; the reviewer would seek the truth halfway between his dates and those of Christian and Weidner (*Archiv für Orientforschung*, Vol. VII, pp. 139-50). Incidentally, Woolley shows his reasonableness at the outset by accepting as the basis for his treatment the lowest date hitherto proposed for Sargon, that of 2528 held by Weidner and Sidney Smith. In the reviewer's opinion this date is too low. A full discussion is outside our province here, but we may be permitted to make a few observations. First, the date proposed by Thureau-Dangin for the end of the First Dynasty of Babylon (1806 B.C.) is astronomically more satisfactory than that maintained by the lowest chronological school (1758 B.C.). Secondly, it is historically

more reasonable, since we must certainly place the end of the First Dynasty and the Hittite invasion an appreciable time before the barbarian irruption which eventually brought the Hyksos into Egypt. The date of the Hyksos invasion has now been fixed by Sethe before 1720 B.C., and the invasion of Syria and Palestine by the barbarian hordes must be placed at least a decade or two earlier (cf. *Ann. Amer. Schools of Or. Res.*, Vol. XII, p. 19 and XIII, p. 75)—probably more, in view of the desert barriers which had to be crossed before each successive stage of the irruption. Secondly, we now have a direct check on the absolute date of the Dynasty of Accad, in a statement of Samsi-Adad I of Assyria (about 1830 B.C., in the reviewer's present chronology, based partly on the new Khorsabad list of Assyrian regnal years), found in an inscription of his, recently discovered and published by Campbell Thompson (*Annals of Arch. and Anthr.*, Vol. XIX, p. 105 ff.). Without going into details, it may be said that this text assigns a duration of seven *dâru* to the interval between the end of the Dynasty of Accad and an event which occurred somewhere in the reign of Samsi-Adad I. Campbell Thompson reckoned the *dâru* at 70 years, but it appears to the reviewer almost certain that the *dâru* was actually a century (cf. provisionally the reviewer's remarks, *Revue d'Assyriologie*, Vol. XVIII, p. 94, n. 2, and note that *dâru* is the same word as Arab. *dahr*, "century"). In this case we have an interval of 700 years, according to the computation of Samsi-Adad's scribes. According to the best attested chronological data which we possess, this interval lasted $30 + 125 + 7 + 108 + 226 + 203 - x$ years (where x is the time between the end of the interval, in the reign of Samsi-Adad I, and the fall of the First Dynasty of Babylon). Discarding x , since the Assyrian king in question certainly reigned at the very end of the First Dynasty, if not even after its fall, we obtain a total of 699 years, which is so close to the total of seven centuries that the former figure can hardly be very far wrong. It does not follow that our round number is absolutely correct, since the scribes may have added dynasties or parts of dynasties which were really contemporaneous, but since the Assyrian computation is probably based on an entirely independent chronological system, the agreement is striking. It follows that the end of the Dynasty of Accad should be placed about 2500 or a little earlier, and that its beginning falls about 2680 or earlier. If we date the victory of

Sargon I over Lugalzaggisi about 2650 B.C., we cannot be far wrong.

Turning to the cemetery of the Dynasty of Accad, we may then perhaps raise Woolley's date for it from 2600-2400 to 2700-2500, since his estimate of its duration is very reasonable in itself, in view of the evidence which he gives. On the other hand, he calls attention to the relatively closer relation of the cylinder seals found in it to the Third Dynasty type than to the pre-Sargonic one. The reviewer would, therefore, prefer to keep Woolley's dates as they are, and to suppose that the cemetery continued in use during the Gutti period, which was culturally only the continuation and decadence of the age of Accad (which itself did not really begin until the reign of Narâm-Sin, about 2600 B.C.).

For the "Second Dynasty" group of tombs, Woolley, on cogent grounds, infers a date near the time of Entemena of Lagash; following Sidney Smith's date of ca. 2600 for the latter, he places the burials of this phase in the century preceding. Our chronology forces us to place Entemena about 2750 B.C., i.e., a century and a half earlier; the cemetery might, therefore, belong to the twenty-eighth century instead of to the twenty-seventh.

So far our dates have been higher than Woolley's. Now, with little documentary chronology of any value to check his dates, they become much lower. It does not necessarily follow that we must allow three or four times as long for the "wholesale change in fashions" (p. 216) between phases II and III as for the comparatively minor changes distinguishing III and IV. Changes in culture tend to be abrupt and to include nearly all departments of life, as has been abundantly demonstrated by stratigraphic excavation. His dates of 3100-3000 for phase II ("First Dynasty") and 3500-3200 for phase I (Predynastic) can hardly be correct, since both belong to the apogee of Sumerian culture, to the same general age as the remains from the period of Ur-nanshe-Entemena at Lagash, as Weidner and Christian have shown in detail. The reviewer is not in sympathy with the attempt of these scholars to reduce the length of the classical Sumerian age to so short a period as they allow. On the other hand, recent discoveries have demonstrated the fact that two relatively homogeneous periods of considerable duration (the Warka and Jemdet Nasr periods) intervened between the beginning of the classical Sumerian age, when plano-convex bricks were used, and the end of the preceding

Tell El-'Ubaid culture, which was itself, as Mallowan and others have proved, the closing phase of a prolonged Chalcolithic age, with many sub-periods. Unless we wish to push the Tell el-'Ubaid and preceding cultures far back into the fifth and preceding millennia, we must not allow too long a duration to the classical Sumerian age. It is true that this argument is inconclusive, but the archaeologist who has watched the emergence of the Chalcolithic into our field of vision, in Egypt, Palestine, Syria, and Asia Minor, as well as in Mesopotamia and Persia, cannot but feel the points of contact and be acutely conscious of the reciprocal bearing of all chronological conclusions. Now that we have, in the dark-gray burnished ware, a common element in the Warka age of Mesopotamia and the corresponding cultures farther west, we must be more critical of a view like that of Woolley, who is forced by his chronology to date the Warka age before 4000 B.C. The reviewer would be inclined to date it in the third quarter of the fourth millennium, with the Jemdet Nasr culture following in the last quarter. If we place the "First Dynasty" tombs of Ur in the twenty-ninth century, roughly speaking (i.e., in the age immediately preceding and following Ur-nanshe of Lagash), and assign the Royal Tombs to the thirtieth century, there is no need of going beyond 3100 B.C. as the presumptive outer limit of the use of the oldest cemetery of Ur treated by Woolley.

We should like to discuss many details in connection with the amazingly rich material which is published in the volumes before us, but space forbids. In closing we wish again to emphasize the importance of the work, which will become just as indispensable to the comparative archaeologist as Evans' *Palace of Minos* or Reisner's *Mycerinus*.

W. F. ALBRIGHT

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TELL HALAF: A NEW CULTURE IN OLDEST MESOPOTAMIA, by Dr. Baron Max von Oppenheim. Translated by Gerald Wheeler. London and New York, G. P. Putnam's Sons, 1932. Pp. XVI+337, with maps, illustrations in text, and 68 plates in color and half tone. \$5.00.

Ever since the year 1908, when *Der Alte Orient* came out with Baron von Oppenheim's "Der Tell Halaf und die verschleierte Göttin," archaeologists have had a more than perfunctory interest in this site close by the Khabur, in Central Mesopotamia. The discovery of extensive sculp-

tural remains was a notable event in those days, especially when the carvings happened to include a fascinating basalt figure of a veiled goddess representing a novel type of art. But while his readers were content to regard the finds with the customary scientific detachment, the genial baron had gone beyond the purely contemplative stage; for he had fallen, as he tells us with disarming frankness, under the spell of the mysterious goddess, from which there was to be no release. The result was a deep-rooted interest in the culture of the Khabur region, which led to several campaigns of excavation spread over a number of years. It is just as well that the silent goddess could effect so much with her mysterious smile; otherwise the excavator might have been deterred by the many obstacles that beset his path. And now that we are in a position to survey the rich harvest of those strenuous years, we are disposed to envy the baron his presiding deity whose efforts were instrumental in bringing to light the treasures of Tell Halaf, and of the related site to the south known today as Jebelet-el-Beda.

One way of judging the importance of a given archaeological discovery is by the number of problems which it has raised. The controversies revolving around the Tell Halaf objects are far too numerous to be listed in this review. Two problems may be singled out, however, for a brief discussion. They concern the origin of the Khabur civilization and the date of its sculptures.

Baron von Oppenheim regards the Khabur region as the center of a third great and independent culture by the side of those of Egypt and Babylon. To the new civilization he would apply the name "Subaraic," following the lead of Arthur Ungnad. In a very broad sense this view may pass as correct: the cultural background of Tell Halaf is certainly neither Egyptian nor Sumerian, and there is some excuse for calling it Subaraean. But the implied assumption that this third cultural group (which used to be called "Syro-Hittite") was necessarily homogeneous will not stand closer scrutiny. As a matter of fact, the unity of the so-called Babylonian civilization is now known to be also a myth. Many disparate elements entered into the make-up of the Sumerian culture, and matters are even more complicated in Central Mesopotamia, Syria, and Anatolia. What the author means by Subaraean seems to have been for a long time a dominant motif in the northwest, but not an all-embracing cultural entity. Moreover, the term Subaraean

is likely to be confusing. It is correct only when used in a geographical sense, with reference to the area north of Akkad; but it must not be confused with the ethnic and linguistic connotation "Hurrian," with which it is by no means interchangeable, as the author would assume in common with many other writers. If the Subaraeans originated the earliest painted pottery of Tell Halaf, then a different group was responsible for the Jemdet Nasr ware, and some third element evolved the Hurrian fabrics of Tell Billa. We look for simplicity and uniformity where the pattern is in reality rich and intricate.

Even more disturbing, though no less fascinating, is the chronology of the several sculptural stages represented by the carvings from Tell Halaf and Jebelet-el-Beda. The author would place his earliest specimens in the fourth millennium and the rest of his sculptures not later than the third. In this view he is supported by the expert, if apodictical, opinion of Herzfeld. But nearly all critics would relegate the bulk of the Tell Halaf carvings to the end of the second millennium! On both sides the arguments employed have been chiefly of a stylistic nature, inasmuch as the circumstances of discovery admit of no definite stratigraphic interpretation. Throughout this discussion the author has remained unshaken by the opinion of the majority. He will therefore derive much joy from a very recent discovery at Warka, where a stele has been unearthed in one of the Jemdet Nasr deposits (end of the fourth millennium) which bears a remarkable resemblance to the older sculptures from Tell Halaf.¹ Again one is awed by the mysterious power of the veiled goddess who, in addition to guiding the excavation, appears to have inspired the correct solution of one of the most knotty problems resulting therefrom. The baron is to be congratulated on more counts than one.

E. A. SPEISER

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CHAMBER TOMBS AT MYCENAE, by A. J. B. Wace.

Pp. xiii+242 frontispiece, 50 illustrations in the text, 57 plates (9 in color). Oxford, The Society of Antiquaries, 1932 (*Archaeologia*, Volume LXXVII, actually issued 1933).

Although they had to wait more than half a century for the recognition they merited, the

¹See Nöldeke, *Die Ausgrabungen in Warka 1932/3*, p. 6, and the remarks of von Bissing in *Archiv für Orientforschung*, IX, p. 208, n. 1.

royal shaft graves at Mycenae have at length been treated exhaustively in a meticulous and discriminating study;¹ the majestic beehive tombs at the same site² and most of those elsewhere on the Greek mainland³ have likewise been described with painstaking accuracy and thoroughness; and our knowledge of the burial customs of royalty in the Late Helladic Bronze Age is consequently about as full as can be expected from the surviving evidence yet available. Less spectacular, perhaps, but equally important for a reconstruction of the history of their age are the resting places of the humbler ranks of Mycenaean society, long recognized in the chamber tombs which excavations have brought to light in increasing numbers at a score of sites in Central and Southern Greece. More than 200 were opened at Mycenae alone by the late Professor Tsountas in his decade of fruitful researches there; but, although he has given us some excellent summaries of his acute observations and conclusions, the bulk of his material has never been published in detail. In fact, no such cemetery of any considerable size on the Greek mainland has hitherto been adequately treated in the admirable manner in which, for example, Sir Arthur Evans has dealt with the Prehistoric Tombs of Knossos. This gap of long standing is now fortunately being filled; and in Mr. Wace's important book we have for the first time a detailed comprehensive publication of an extensive cemetery of Mycenaean chamber tombs.

These tombs lay in three rather widely separated areas; one group along the modern road, not far southward of the Treasury of Atreus, one on the northern and one on the southern slopes of the ravine which in its westward course divides the ridge called Phourno Diaselo (marked by its two tholoi, the Cyclopean Tomb and the Tomb of Genii) from the southern height, Kalkani. The two former areas had been partially explored by Tsountas who examined three tombs in each; but the Kalkani hill had never before been investigated. Mr. Wace discovered and excavated a total of 24 tombs: three in the first mentioned region, six in the second, and fifteen on the northern slope of the Kalkani hill. Of these 24 sepulchres one was empty, and one had been thoroughly

plundered; the remaining 22, varying not a little in size and shape, produced a rich harvest of objects of many kinds. The number of burials in each chamber, as calculated from the surviving skulls and fragments, ranged from 1 to 21, reaching an aggregate of ca. 196, or an average of nearly 9 per tomb. On the evidence of their contents Mr. Wace was able to determine that 8 tombs had been constructed and first used in early Mycenaean times (*L.H.* I-II) and 14 in Late Helladic III. Six tombs yielded gold objects of various kinds, including a handsome signet ring; silver was represented by three rings, a pin, and some fragments; bronze by a fine dagger, five knives, arrowheads, awls, tweezers, scale-pans, pins, a ring, etc. Engraved gems in amber, faience, glass, and stone totalled 20, among which are especially noteworthy two carnelian lentoids with practically identical representations of the goddess with the double axe, and an onyx of high artistic merit portraying a wounded lion. Jewelry, apart from gold and silver, included quantities of beads and ornaments in agate, amethyst, crystal, onyx, steatite, amber, faience, and glass. Ivory was represented by part of a fine inlay, fragments of combs, a mirror handle, etc.; and 65 or more boar's tusks from Tomb 518 permitted a very interesting reconstruction of a Mycenaean helmet. Some 35 figurines and animal figures of terracotta were recovered and approximately 350 vases which provide us, what was hitherto lacking, an extensive and for the most part safely datable ceramic series for the Late Helladic period at Mycenae.

All this material is clearly presented in Mr. Wace's book. Parts I and II offer a methodical, straightforward description of the tombs and their contents, detailed and yet concise, constituting a record of permanent archaeological and historical value. Plans and sections of each tomb are shown, the position of all the important remains is noted, and most of the objects recovered are illustrated. Part III, comprising nearly half the volume, contains the excavator's commentary on his discoveries and his interpretation of their meaning; and this is very interesting reading, animating, as it were, the cold body of observed fact. The first section discusses the tombs themselves and the methods of burial; the extent of the material and its relatively well established chronological sequence giving ground for some shrewd inferences and conclusions. The longest section, on the pottery, contains a valuable and

¹ Karo, *Die Schachtgräber von Mykenai*.

² Wace, *B.S.A.* XXV, 283-402.

³ Dörpfeld and Müller, *Ath. Mitt.* XXXIII, 1908, 295-317; XXXIV, 1909, 269-328; A. W. Persson, *Royal Tomb at Dendra*.

well documented analysis of Late Helladic ceramic art, with reference to technique, shapes and decoration, a critical study which contributes much toward clarifying the mainland's debt to, and independence of, contemporary Cretan culture. Other sections, each adding something new and worth while, deal with metalwork; engraved gems; beads; ivory, bone, and boar's tusks; terracotta figurines; spindle whorls or buttons; faience, glass, and glass paste; and stone and shell; and the volume concludes with an appendix by Professor Carl M. Fürst in which the distinguished anthropologist summarizes his careful study of the skeletal material from these chamber tombs, which originally appeared in his *Zur Anthropologie der prähistorischen Griechen in Argolis*.

The nine plates in color are particularly successful and pleasing, giving a good idea of the charm of Mycenaean jewelry, metalwork and pottery. The illustrations in black and white are also clear and satisfactory; and the book is beautifully printed and handsomely bound, with a good index to facilitate its use. Altogether it marks a notable advance in our knowledge of the life and burial customs of the Mycenaean people, an advance which owes much to Mr. Wace's patient, conscientious and understanding labor.

CARL W. BLEGEN

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THE ATHENIAN ASSESSMENT OF 425 B.C., by Benjamin Dean Meritt and Allen Brown West (University of Michigan Studies, Humanistic Series, Vol. XXXIII), Ann Arbor, University of Michigan Press, 1934. Pp. xiv and 112. \$2.50.

For the restoration of the Athenian decree governing the reassessment of tribute made in 425/4 B.C., Meritt and West have now given us a firm epigraphical basis. With their usual combination of exactness and ingenuity they have determined the positions of the 21 fragments identified as belonging to the stone on which the decree was inscribed; and, this done, they have been able to compute the number of letters to the line at 70 (as does Hiller in *I.G.² I*) and the width of the stone at 1.210 m. For the position of one fragment alone (no. 4 in their count) they have no lapidary evidence.

On the same epigraphical basis, save for the location of frg. 2 nearer frg. 1 by two letter-spaces, they prepared a text which was published by Tod in 1933 in *Greek Historical Inscriptions*, 66. Now

under their own signature they have presented us with a new text. A comparison of the two texts will show that they have made numerous alterations of phraseology (usually improvements) without much change of meaning.

Since three fifths of the letters are lost and we have no other assessment decree to furnish parallels, the task of restoring the gaps is so great that "certainty or finality" (Tod) is not attainable. Yet there can be no doubt that the new text represents a notable advance in making the decree intelligible. In general, the authors, while taking scrupulous account of the conditions imposed by space and traces of letters, allow the restorations they propose to commend themselves by their fidelity to epigraphic style and the sense they yield in their contexts.

As the regulations for the assessment now stand the assessors (*taktai*) do not seem to have had much to do: they simply "enroll the names of the cities" (1.9)—for which task they are given only five days—and prescribe the routes to be taken by the heralds who are to announce the assessment to the cities (11.40 f.). That is to say, the rôle of the assessors seems to end before the *taxis* really begins. We should expect them to have further duties assigned to them, unless they were simply a committee of councillors functioning under cover of the Council, the body to which is ascribed responsibility (subject to review by a dicastery) for the entire assessment (11.58 ff.). If this is so, we might read in 1.8 *ἐς heavrēs* (or *heavrōn*) instead of *ἀντίκα μάλα*. That the *taxis* was regarded as essentially the work of the Council seems also to result from the phraseology of lines 54 ff. (cf. 1.45). Here begins a second decree, moved, like the first, by Thudippos, but passed in a later prytany. From its opening phrase, *ἡπόσ[εσι] πό[λεσι] φόρος [ἐτάχ]θ[ε]*, it is clear that at the time of this decree the *taxis* was already completed. The prytany is Aigeis. Since the Aigeid prytany cannot have served earlier than fourth (cf. *I.G.² I*, 324, ll. 18 f.), and the fourth prytany ended on Maimakterion 4th (p. 53), whereas the envoys of the allies were to be summoned during Maimakterion so as to be on hand for the judicial review beginning on Posideion 1st, the *taxis* referred to as already completed at some point during the term of Aigeis must have been the draft of the Council. This schedule of assessments, which was supplemented by the additional requirement of the second decree that all the allies should bring an

ox and a suit of armor for the Panathenaia, reflected in its individual items the proportional increases needed to attain the desired total and remained in possession of the field except as modified in details by abatements granted by the court to particular cities. It is true that the Council was also to sit continuously during the sessions of the court, and that the *taxis* is apparently thought of (11.17 f.) as the joint product of the Council and the court, but this is intelligible even if the draft of the Council was expected to remain substantially unchanged during the judicial proceedings.

With the conclusions of the authors (pp. 52-7) as to the chronology of the document (*gnome* of the Council in the second prytany, Oineis; *psaphisma* of the People in the third prytany, Aiantis or Leontis; supplementary decree in the fourth prytany, Aigeis) I am in full agreement; and for an additional reason. In the *gnome* the prytany of [Oine]is (. . . is) is required, under severe penalties, to submit the resolution of the Council to the People on the second day after some movement of the army, and, if the business was not finished on that day, to continue it on the next, and thus carry on until it *was* finished. We do not know how many days were required to complete the military movement, and neither did the Athenian Council apparently; but it is clear that at least three days and probably more were expected to remain thereafter before the term of [Oine]is expired. My point is this. According to the Athenian system the prytany to succeed at any given moment of change was unknown (except in the case of the last prytany) till the very end of its predecessor's term when the lot was cast determining the succession (Ferguson, *The Athenian Secretaries*, pp. 20 ff.: inscriptions subsequently published confirm the conclusion there reached). Hence the mention of [Oine]is three plus *x* days before the expiry of the officiating prytany shows that the officiating prytany was itself [Oine]is. It then follows that the prytany in office when the *gnome* was converted into the *psaphisma* was Aiantis or Leontis. Manifestly, as Meritt and West note, the military movement was not effected in time for Oineis to handle the business, which, accordingly, went over to its successor. Kolbe's suggestion (p. 57), that the order is Leontis or Aiantis, Oineis, Aigeis, falls to the ground.

In line 16 it is provided that "the *nomothetai* shall establish a new court of one thousand

jurors" (*λοι δὲ [νομο]θέται[ι δικαστέριον] νέον κα[θ]ιστάντων χ[ι]λίας δικαστᾶς.*) This item, say the authors, "is one of the really valuable contributions of fragment 4," and, they might have added, of the entire decree—always provided that the restoration is correct. Unfortunately fragment 4 is the one of the fragments given its position without lapidary support. It is an island, so to speak, attached to fragment 1 by restorations joining its eight lines with corresponding lines of the mainland. The restorations inspire confidence: no one of them is assailable epigraphically; but are they certain? The fragment contains only 26 letters and not a single complete word. That gives very little with which to work. Apart from our decree *nomothetai* appear for the first time in our record in a casual mention by Thucydides (VIII, 97, 2) in describing the overthrow of the Four Hundred and the establishment of the Five Thousand in 411 B.C. In our decree they would seem to be a standing committee. Is that credible? When *nomothetai* appear for a second time it is in 403 B.C. on the fall of the Ten (Andoc. *De Myst.* 83 f.). Then they are of two kinds, "the *nomothetai* chosen by the Council" and "the five hundred *nomothetai* whom the demesmen chose." It is conceivable that the *nomothetai* chosen by the Council were a nucleus regularly constituted in the fifth century to be enlarged into a real constituent assembly only when serious changes in the *nomoi* were contemplated; and that the *nomothetai* of 425 B.C. were such a nucleus. Our *nomothetai*, unlike the 500 *nomothetai* of 403 B.C. and the *nomothetai* of the fourth century, were subject directly to the orders of the Council and People. The rôle assigned to them is not the regular rôle of the *thesmothetai* with whom in the lexicographical tradition they are often confused: it is not to fill up (*πληροῦν*) a dicastery; it is to establish a "new" dicastery, i.e., a dicastery such as may have existed previously but which was not regularly impaneled annually. For such a rôle *nomothetai* elected by the Council were presumably competent. If only *νέον* were certain! The word is restored *πυρά]νεον* by Hiller.

Before passing on to the List of Cities inscribed on the lower portion of the stone I should like to say that I feel doubtful whether anyone can give us a convincing restoration of lines 46-50. The words preserved are too few, scattered, and insignificant. The rôle assigned by Meritt and West to the *strategi*, specifically their introduction

of *dikai* to the Council, raises questions of procedure not easily answered. To the List of Cities is prefixed a rubric. As the authors note (p. 51), this is "not part of either decree" but belongs rather "to the historical record of the assessment." To this example of an "historical post-script" I respectfully invite the attention of Kolbe (*G.G.A.* 1934, p. 252). By identifying and placing the fragments (25 in all) on which are listed the cities and the amount for which each city was assessed, Meritt and West have again laid for the first time a firm epigraphical basis. They have vindicated for this document the three fragments (nos. 25, 35, and 36) which Tod (*Op. cit.* pp. 157 ff.) assigned to a second assessment list and the three fragments (nos. 33, 34, and 35) which, on the basis of peculiarities of certain letters (now convincingly explained), were thought to belong elsewhere; they have refuted the contention of Kolbe (*Sitz. Ak. Berlin*, 1930, pp. 345 f.) that *I.G.*² I, 64, frg. Z' and Y (Tod, pp. 159 ff.) are parts of another copy of our document (pp. 84 ff.); through the courtesy of A. M. Woodward they are enabled to use his identification of *I.G.*² I, add. 310, p. 303 as a new fragment (no. 38); and they have made more correct readings of letters here and there throughout the inscription. The only lapidary problem they leave unsolved is the correct position to be assigned to certain portions of the Ionian list (nos. 28-31): the important thing is the determination that they belong to the Ionian list. The cities were listed in four columns each of 113+ lines. As restored, the catalogue began in Col. I with the Insular list followed by a summation of tribute (163 talents, 410 dr., 3 obols) and an uninscribed space. Then came in Col. I and II the Ionian list with a summation and a space; then in Col. II and III the Hellespontine list and a summation (250+ talents) with the list of the Aktaian cities (and a summation) added directly and thereafter a space; and finally the Thracian list in Col. III and IV and a summation (310+ talents) with the Pontic list attached directly thereto. At the end came the addition of all the items: $\left[\frac{X}{T}\right]$ $\Pi \Pi \Pi \Pi \Pi \Pi \Delta [-]$, i.e., 1460+ talents.

The essential novelty is the final figure. The alternative favored hitherto by most scholars, including the authors, is 960+ talents. No other alternative is possible. It must be granted that the text of the decree, as restored, does not prepare us for such a large total. The fact is recognized that the tribute theretofore levied was "too

small"; but the proviso as to the scale of the new assessment is that the Council and jurors "shall not assess a smaller amount of tribute on any city than it was paying before, unless because of impoverishment of the country there is manifest lack of ability to pay more" (11.21 f.). This fixed a minimum. It must have been a cruel surprise to the envoys of the allies when they reached Athens in Maimakterion 425 B.C. to find that the decree, which had been explained beforehand to their cities (11.42 ff.), involved an assessment far in excess of the minimum, in fact, over three times as great as the historic *taxis* of Aristides. Yet I do not see how we can evade the argument so cogently presented by Meritt and West on pages 88 ff. It there appears that the figures preserved in our document, when supplemented, in the case of the figures missing, by the highest amounts theretofore paid by the cities in question (234+ talents for the Ionian group, 35 for the Aktaian, and 50 for the Pontic), yield a total in excess of 960+ talents. This is a notable substantiation of the position taken by Kolbe in his recent controversy with West and Meritt themselves (*Sitz. Ak. Berlin*, 1930, pp. 1ff.). We can now proceed to a profitable study of the financial policy of Cleon.

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LEKYTHOS: *Archäologische, sprachliche und religionsgeschichtliche Untersuchungen*, von L. J. Elferink. Allard Pierson Stichting, Universiteit van Amsterdam: *Archaeologisch-historische Bijdragen*, Deel II. Amsterdam: N.V. Noord-Hollandsche Uitgevers-Mij., 1934. Pp. 96, plus 4 inset tables and 8 plates. 4.90 guilders.

A *Wort und Sache* investigation, broad in scope and elaborate in presentation, of the lekythos, Greek *lēkythos*. The first chapter includes an archaeological discussion of the lekythos, as a vase for oil and the like, its forms and characteristics, parallels and relationships, history and prehistory, the connections of various forms with the ostrich egg. In the second chapter the author considers the etymology of Greek *lēkythos*, rejects the current explanations, looks to Greek *lekithos* "yolk of an egg", and hence, taking *lē-* and *le-* as prefix, to an Aegean word for egg which he sees surviving in Latin *vitellus* ("quit-ellus") "yolk." The final chapter deals with the use of the ostrich egg as a vessel and the significance of the egg and egg-shaped objects in religion.

Elferink's basic view is that both the vessel and the word are pre-Greek and pre-Indo-European. And that is probably true. Indo-European has no claim on Greek *lēkythos*. The recorded etymologies are, like hundreds of others that still persist in all quarters of the field, based on mere possibility, without real evidence, and accepted tentatively in lieu of something better. The attempt to establish and identify Aegean origin treats extensively possible formal and semantic parallels, sometimes rather far afield, and much of the argument is more or less hypothetical and conjectural. But the study is valuable and suggestive, rich in material and ideas.

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STUDIEN ÜBER DIE ETRUSKISCHEN GRÄBER UNTER
BESONDERER BERÜCKSICHTIGUNG DER ENT-
WICKLUNG DES KAMMERGRAVES. SKRIFTER
UTGIVNA AV SVENSKA INSTITUTET I ROM. III,
by Åke Åkerström. Pp. 210, fig. 43. Lund,
C. W. K. Gleerup, 1934. 15 Kr.

Italic Archaeology is undoubtedly gaining ground. Very valuable work has been done in recent years by excavators and other archaeologists contributing numerous books and articles. Nevertheless, the number of unsolved problems has hardly diminished. What we need most are monographs publishing or collecting the monuments by classes. Åkerström has given us such a monograph on the chamber tomb. It is, I should like to say at once, a very important and a very valuable contribution on account of the author's sober method and his sound judgment as well.

Any research aiming to give a true picture of the Etruscan civilization must take into consideration the strong regional differences. Åkerström is, therefore, right in expounding his material in a geographical order and in dealing with each of the Etruscan towns separately. He starts with the south, Veii, Caere, Tarquinia and so on, goes northward to Vetulonia, Populonia, Volterra and other places and ends with Chiusi and with the Etruscan towns in Umbria, namely Cortona, and Perugia. For each town he traces the evolution of the special type or types of tombs from their first occurrence to the end of the Etruscan period, always relying on dates derived by a painstaking study of objects found in the tombs and by a careful examination of the reports of excavators. The results are most convincing and shed much new

light on the subject. His dates are generally very low: beginning of the "orientalizing period," 725-700 (no chamber tombs before that period), Bocchoris tomb probably slightly later than 700, tombs at Bieda not earlier than 600, Tomba dei Tori 540-520, Sala-Tomb in Chiusi about 600, Tomba di Pitagora second century B.C. Most of his dates will doubtless be accepted. As to the circular tholos tomb at Populonia (No. 1), generally believed to be the oldest one, he offers the very ingenious hypothesis that the fully developed type of the Padere di S. Cerbone cemetery, showing a rectangular chamber is the prototype, whereas the tholos tomb and the elliptical tombs of the Poggio delle Granate are poor and modest imitations of this prototype, made for people who could not afford such sumptuous constructions. It is a pity that the finds in tomb No. 1 are so poor and indeterminate that they cannot be dated exactly. They do not exclude Åkerström's hypothesis, although they are not entirely favorable to it. Very interesting also are the results which the author is able to deduce for the history of the settling of the country by the Italians and the Etruscans thereby either confirming or verifying former opinions. It is impossible to summarize even the main points. I mention the following ones only: If there was an Etruscan immigration, we can assume two waves, the first between 750 and 700, the second about 650. Earliest settlements of the Etruscans were on the coast. Infiltration into the interior was followed by a decline of the towns near the coast in Northern Etruria. There was Greek commerce with Italy before Cumae was founded, as is deduced from the fact that we have vases of a geometric style preceding Cumae ware. "Democratization" in Hellenistic times is shown by the substitution of clan tombs with many burials for family tombs with only a few burials. The cause might have been the absorption of the Etruscan aristocracy by the Italic bourgeoisie.

As to the origin of the chamber tomb, Åkerström differentiates between the southern and the northern coastal type. The northern type occurs at Marsiliana, Vetulonia and Populonia in a highly developed form and technique. Furthermore the main features, rectangular chamber with corbelled cupola and monumental circular socle (crepis), find their parallels in the eastern part of the Mediterranean, the chamber particularly in Crete, the crepis in Caria where the peculiar construction of the corners occurs too.

The author is, therefore, inclined to assume a foreign origin for this type, an assumption with which the reviewer agrees. The southern type, however, is derived by Åkerström from the local fossa. It is true that the transition is gradual and that small and simple specimens of the "tumuletti archaichi" are not very different from big and sumptuous fossae, but there is difference enough to prove that the step from fossa to chamber is not "imperceptible," as the author asserts. I think that the construction of a corbelled roof indicates a break in the evolution and the coming of a new conception of the tomb. As soon as there is a corbelled construction there is the idea that the tomb is a "room," namely the house of the deceased, whereas the fossa is a case which contains the body. Furthermore, if one type of the chamber tomb is of foreign origin, the same seems to me likely for the other type also, inasmuch as this shape, rectangular groundplan with longitudinal vault as exemplified by the "tumuletti archaichi" and the Tomba Regulini Galassi has parallels in the eastern Mediterranean, the tombs at Isopata and at Minet el Beida.

There is a second point in which the reviewer disagrees with the author. It concerns the *tomba a dado* or cube-tomb. He is certainly right in assuming that the tomb consists of two parts, the lower cubical one ending with a low moulding and the upper with a big moulding. But, whereas Bianchi-Bandinelli and Gargana maintain that the lower part reproduces a flat-roofed house and the upper one was used as a platform for ceremonies, Åkerström holds that the cube is only a support for the upper part which represents the base for a cippus which originally stood upon it, but is now lost except in a few cases. Stelae from Saturnia, Vulci and Orvieto which show a cippus put on a base with the same type of moulding give the proof. I do not see why the interpretation of the cubical part as a house should be abandoned. Åkerström does not give any reason for the use of the cube. To put a base on a "support" would be doubling. He cites the tombs at Orvieto as analogies which likewise have a cippus at the top, but here the house character of the lower part is unmistakable and admitted by the author. The staircases too seem to me better explained if intended for permanent use than only made for the construction of the upper part. Concerning another by-product of Åkerström's studies I am glad to state once more my full agreement. He uses the fan-like construction of some tombs at Caere to

argue that the atrium displuvium is derived from the house reproduced in the Italic hut urns.

V. MÜLLER

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RECHERCHES SUR LES JEUX SECLAIRES, by J. Gagé. Pp. 119. Collection l'Études Latines, Série Scientifique, XI. 1934. 3 Kr.

The *Recherches sur les jeux seculaires* comprises a series of four articles which have been published in *Revue des Études Latines* (1931-1933). The first deals with the site of the Tarentum, which the author places in the northwest corner of the Campus at some distance nearer the river than the site accepted by Lanciani and others. The proposed location is preferable to Lanciani's because all the extent fragments of the Acta were found in this vicinity, and preferable to the site in the Ghetto recently suggested by Boyance and Willeumier because it offers a more satisfactory interpretation of references to the Tarentum in ancient literature.

In reviewing the conflicting theories as to the performance of the Carmen Saeculare the author agrees with Warde Fowler that the song was repeated in full on the Capitoline rather than sung in three parts as Mommsen believed. He maintains that there is no justification in the Carmen for a precise distinction between stanzas addressed to Apollo and Diana and those addressed to the deities of the Capitoline. Against such precise distinction he notes that in the address to Ilithyia the epithets and functions mentioned would inevitably suggest both Juno and Diana, who were, moreover, both worshipped on the first night of the *ludi*. This close association of the two goddesses, if accepted, seems to me to militate against the author's own theory of the position occupied by Apollo and Diana. He sees in the recurring prayers to these deities a proof that they were regarded as "intercessors," by whose aid the worshippers might approach the other gods. While other deities are entreated for specific blessings, Apollo and Diana are asked rather for "une bienveillance générale à tous ces vœux." This contrast he finds particularly apparent in the last stanza, which proclaims, according to Gagé's interpretation, that praises of Apollo and Diana are sung by the chorus for the purpose of securing the favor of the other gods, especially of Jupiter. While admitting that the prayers prescribed in the Acta give no hint of any such qualitative distinction between the function of

Apollo and Diana and that of the other gods, he believes that the Carmen probably reflects "la réalité religieuse qui était au fond des cérémonies" more correctly than the ritual. The question still remains whether the Carmen itself justifies this distinction between two "planes" of deities.

In the discussion of the recently discovered fragments of the Acta the author accepts in the main the interpretations of Romanelli (*Not. Scav.*, 1931), and devotes attention chiefly to points on which our information has been increased or interpretation modified by the new evidence. Of particular interest is the phrase "utique semper Latinus obtemperassit" (Romanelli 11, 51 and 56) which the new fragments establish as the correct reading instead of Mommsen's "utique semper Latinu[m] nomen tueare . . .". An anachronism in a prayer of the Augustan age, the phrase seems like an echo of a time "où le Latinus représentait une puissance à dompter et à maintenir en sujétion." While in 249 B.C., when the *ludi Tarentini* were instituted, the chief threat of danger was from the Carthaginians, it is not impossible that there may have been fear of the defection of the Latin allies (p. 55). A more attractive hypothesis is offered by Professor Lily Ross Taylor (*A.J.P.* LV, 1934, pp. 101-120), who shows that the phrase attests a celebration of the *ludi* a century earlier, in the Varronian year 348, at "a time when Rome was especially anxious about the loyalty of the Latins who are named in the prayer and was also suffering from a pestilence such as *ludi saeculares* were supposed to avert." This suggestion is based on a more thorough examination of all the evidence bearing on the earlier history of the *ludi*, and is more convincing than that which Gagé offers merely as one of several possible explanations. On slight evidence from the new fragments it is suggested that the *pompa* and *puer[i]* mentioned at the end of the Acta of 17 B.C. refer to a performance of the *ludus Troiae*, which is now known to have been given at the *ludi* of both Claudius and Severus.

The last chapter discusses the two series of *ludi saeculares* recognized in the ancient tradition: the first recorded by Censorinus and Zosimus, which included the games of Augustus, Claudius, Domitian, and Severus, the second preserved in full only by Aurelius Victor, which included the games of Claudius, Antoninus, and Philippus. While modern scholars ordinarily have been unwilling to admit any distinction between the two series except that of difference in computation of

the *saeculum*, Gagé believes that there was a divergence also in ritual, on the basis of which he calls the first series (omitting the games of Claudius) true *ludi saeculares*, the second *jubilés de la fondation de Rome*. His thesis is that the *jubilés* of Antoninus and Philippus were based on Hadrian's *ludi circenses* which commemorated the birthday of Rome and the foundation of the *Templum Urbis*. This theory would explain why the Claudian games were erroneously included in both lists: the year of their celebration corresponded with the computation of years for the *jubilés*, but the ritual was that of the *ludi Tarentini*.

A treatment of the new fragments of the Acta and their contribution to the history of the *ludi saeculares* is welcome, and Gagé has suggested some interesting re-interpretations. It is important to remember, however, that at certain points the theories proposed, while intrinsically attractive, necessarily rest on very slight evidence.

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DER CAESAR VON ACIREALE, by *Erich Boehringer*. Pp. 27, pls. 48. Kohlhammer, Stuttgart, 1933. M 7.50.

Portraits of Caesar are scarce in comparison with the abundance of heads of Augustus. Furthermore, recent researches make it probable that the existent heads of Caesar were not made during his lifetime, but are either later copies which change the original style to a considerable extent or are even creations of later times. I refer especially to Curtius' article in Vol. 47 of *Röm. Mitt.* It would be, therefore, of the greatest importance, if a portrait dating from the years when Caesar was still alive could be found. Such a discovery is announced by Boehringer in the publication under review. In 1730, close to the small Sicilian town of Acireale, the remains of a Roman temple, an inscription naming Caesar, a bust and some minor finds were uncovered. The bust which is now in the Biblioteca Zelantea in Acireale was first called a "fauno," later Cicero, and recently Caesar. Boehringer, by a careful analysis of coins and of the literary tradition about Caesar's features, comes to the conclusion that the bust actually represents Caesar. I am more and more inclined to agree with him inasmuch as according to my chronological scheme which I hope to publish shortly the head is to be dated on stylistic grounds exactly to the last years of Caesar's life.

We would thus have not only a well preserved portrait, only the tip of the nose being lost, and one that is absolutely authentic, but also an excellent one revealing much better the character of Caesar than all other extant heads. Boehringer praises it in the hero-worship style characteristic of the "Stefan George Kreis" which may not be very digestible to English readers.

The author also gives a carefully prepared list of all known portraits of Caesar and of others wrongly identified as Caesar with full bibliography and good stylistic analyses. He divides the heads into two groups: the first group, represented by heads in the Villa Mattei, Munich, the Sala dei Busti, Mantua, and the Museo Torlonia, are Augustan and Claudian copies of a portrait made during Caesar's lifetime. The second group is represented by heads in Pisa, Turin, the Museo Pitti, the Museo Chiaramonti and go back to an original dating from the time of Augustus. Augustan is also the rather suspicious looking Caesar Luxburg which he accepts as genuine. My own judgment on this point must be withheld since I had no opportunity for a personal examination. The head of green schist at Berlin is, according to Boehringer, also ancient and of Egyptian workmanship; but the latter assumption is impossible, because the style is absolutely different from all Egyptian heads of that time of which we know (cf. Bissing-Bruckmann, *Denkmäler ägyptischer Skulptur*, pls. 105-111). I do not like to conclude the review without mentioning the unusually high quality of the plates which conforms with the tasteful style in which this important monograph is written.

VALENTIN MÜLLER

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PARTHIAN POTTERY FROM SELEUCIA ON THE TIGRIS, by Neilson C. Debevoise. Pp. xiii+131. pls. A, B+xiv, figs. in text 8+417. Ann Arbor, University of Michigan Press, 1934. \$3.00.

This excellent volume fills a long-felt want in that it places before the reader the series of pottery types from Seleucia. This series, as the author states, seems to provide us with a satisfactory picture of Parthian ceramics in Mesopotamia, including nearly all the types found at sites as far south as Nippur and as far north as Samarra. A drawing in addition to a careful description defines each type; photographs illustrate typical examples; and notations in the description show the level and provenance of each piece. In addition,

a very valuable table records the number of each type found in the successive levels.

At Seleucia four levels have been distinguished. Level I includes two occupations, the first dating from 200 A.D., when after the sack of the city by Septimius Severus important occupation of the site seems to have ceased, to 165 A.D. when the city was captured by Avidius Cassius; the second from 165 A.D. to 116 A.D. when it was burnt by Trajan. Level II reaches to 43 A.D. when the revolt of the city was crushed by the Parthians. Level III includes the first century of Parthian rule to 141 B.C.; and Level IV the Seleucid period. One may, therefore, for the first time trace the ceramic development in a Hellenistic city of Mesopotamia and study the changes brought about by Parthian occupation.

It must be confessed that the title is a little misleading and might better read "Pottery from the Parthian Period." Neither title is quite broad enough, however, for the author includes also the types from the Seleucid level to show the continuity of development on the site. Unfortunately, pieces from this lowest level number only 51 out of the grand total of 1592, so that evidence as to which types are new in later levels is not conclusive. It is to be regretted that the author did not compare the common types at Seleucia with types from more ancient sites in Mesopotamia and attempt to show which vessels are common local types and which new developments in the successive periods. Mr. Debevoise states that the failure of the revolt in 43 A.D. marks a distinct change at Seleucia and that at that date a sharp break occurs in the character of the architecture and other forms of art, a greater predominance of Oriental and a diminution of Hellenistic influence. Except for the change in one type of storage jar (p. 15), however, no differences in the ceramic evidence are cited; and, curiously enough, the glazed slipper coffins, usually ascribed to the Parthians were all with one exception found in Level III before the change away from Hellenistic influence. It is possible by means of the table to discover the changes which take place but the very number of types renders this study difficult.

A pressing need in Mesopotamian ceramics is a study showing when new types appear and whence they come. Especially would this be valuable for the Parthian period since it would tend to show the nature and importance of Parthian influence on individual sites. The material is, of course, difficult of access; but a comparative study

of the published material from Assur, Babylon, Dura, and Susa might yield very important results. Mr. Debevoise states that he has studied most of the Parthian material in this country and in Europe but he fails to show the results of this study.

Perhaps it is still too early to expect such a study to yield very fruitful results. At any rate, the volume of Mr. Debevoise places at the disposal of the student the material from Seleucia in a very convenient form. As soon as more such volumes are published from other sites a comparative study will be an easy matter and the excavation of new sites in Mesopotamia will be very much simplified. Mr. Debevoise is to be congratulated on the promptness with which the volume has been published and on the large number of illustrations he has included. The excavators of Seleucia should, likewise, be commended for the attention paid to ceramics, an attention rarely accorded in a land where types change very slowly and innovations are few. Certainly the book of Mr. Debevoise will be of immense value to the excavator in Mesopotamia and to every student of Mesopotamian pottery.

CLARK HOPKINS

YALE UNIVERSITY

OPGRAVENINGEN OP HET DOMPLEIN TE UTRECHT, Wetenschappelijke Verslagen I-II, by *A. E. Van Giffen* and *C. W. Vollgraff* (Provinciaal Utrechtsch Genootschap van Kunsten en Wetenschappen). Pp. 74; 38 figures, 25 plates (1 in colors); Haarlem, Willink & Zoon; 1934. Fl. 6.90.

The Cathedral Square of Utrecht has yielded important information regarding the Roman and mediaeval history of the city. In 1929 and 1933 two adjacent small excavations revealed a stratification very carefully developed by Van Giffen in his account of the preliminary campaign, and various buildings associated with two periods of Roman military occupation together with Carolingian and Merovingian remains of considerable interest. The first Roman occupation, which is not preceded by any earlier settlement, is precisely dated between the year of Claudius' decision to establish the Rhenish frontier (47) and the revolt of the Batavi (69-70), when the camp was burned. The layer representing the next three decades is characterized by traces of floods like that very inundation of A.D. 70 mentioned by Tacitus, and at the end of the century begins the

second occupation which lasted until at least the middle of the third century.

Of especial importance is a splendid hoard of fifty aurei, mostly Neronian, which were lost at the time of the destruction of the first camp. Five sherds of a new variety of polychrome glazed pottery (from the second occupation?) are well described and illustrated in full colors. A fine strigil inscribed *EROS SOLONES*, from the first occupation, is briefly discussed; a fuller treatment of the significance of these Greek names on the Lower Rhine would have been interesting. There are of course quantities of military titles (*EX(ercitus) GER(manicae) INF(erioris), LEGXXX, LEG I M(inerviae) A(ntoninianae)*, etc.) and several consular tiles of *Didius Julianus* and *Macrianus*. Many fragments of terra sigillata occur, but the signatures are not numerous and the decorated sherds are for the most part small. The most important piece chronologically is a signature of *Logirinus*, who was not previously known as active in Nero's reign, and further excavations will doubtless produce other modifications of present chronology. The parallels to the sigillata are handled well, though perhaps a trifle summarily, and there are no references made to British excavation reports (e.g., *Richborough III*, pl. xxiv, 8, apropos of fig. 27, 10).

The mediaeval finds are given due attention especially the eight-line elegiac epitaph of the soldier *Ratger*, which is assigned to the early Carolingian period.

The illustrations in the text and on the plates deserve a word of special commendation. The photography and drawings are generous and excellent. No less remarkable is the promptness of publication; with less recensorial procrastination these words might have been written less than nine months after the excavation closed! All in all, the publication of Utrecht is a worthy example of Dutch scholarship—one which it is to be hoped is only a precursor to further studies on the same site.

HOWARD COMFORT

HAVERFORD COLLEGE

RECHERCHES À SALONE, Tome II, by *Ejnar Dyggve* and *Frederik Weilbach*. Pp. 154, pls. 3, figs. in text 102. Rask-orsted Foundation. Copenhagen, J. H. Schultz, Press of the University, 1933.

The first volume in this series appeared in 1928. It received a very favorable review by

Salomon Reinach in the *Revue Archéologique* for January-June, 1929, and a more thorough and equally laudatory one in the *Byzantinische Zeitschrift* for 1931, by Rudolf Egger, whose opinion is weighty since he himself is one of the authors of *Forschungen in Salona*. This second volume seems to me a worthy successor to the first, with certain important reservations. It is devoted to two distinct buildings, the amphitheatre and a small temple which lies back of the theatre. Frederik Weilbach deals with the temple in 22 pages of the text and Ejnar Dyggve studies the amphitheatre in the course of 118 pages. The architectural surveys and all drawings for both buildings were made by Dyggve.

The section on the amphitheatre opens with an introductory chapter. After recounting the previous studies and excavations of the building, beginning in the early XVIII century, the author distinguishes two types of amphitheatre, "le type massif" which relies on a solid earth substructure, and is well represented by the example at Pompeii, and "le type creux" under which heading comes the Salona amphitheatre. The "type creux" is an articulated structure of radial and circular walls and horizontal floors, of which the Colosseum is the paradigm. Dyggve (p. 40) sees the resultant compartments, or cells, into which the structure is divided by this articulation, as representing a basic Roman concept, both as structure and aesthetic expression. The compartment, he says, is largely the nerve of Roman architecture, and he proceeds to relate it to the term *tabulatio* employed by Vitruvius. The generalization is a profitable one, and can well be applied, for instance, to Roman vaulting. The two following chapters describe minutely the extant remains. This description is aided by Dyggve's beautiful drawings, by a clear system of reference to them, and by a series of good photographs. In the course of the survey a number of trenches were cut. Apparently this was done without respect to the principles of stratigraphy; at least no reference to strata is given. This seems a surprising omission in a survey so competent otherwise. Certainly one would expect that the purpose and periods of the curious underground passage could have been clarified by a scrutiny of the faces of trenches VII, VIII, and IX on plate I. Yet Dyggve's main conclusions seem to rest on adequate architectural evidence, irrespective of stratigraphy. This is fortunate. On pp. 74-77 occurs another generalizing digression of a fruitful

nature, on the development of Corinthian capitals. Dyggve disavows any pretensions as an epigrapher, yet, in chapter IV, he has listed and carefully described thirty-four relevant inscriptions. None of these affords an absolute date for the edifice but the author has attempted, on p. 80, a partial restoration of the great donor's inscription, which appeared on the podium around the arena; and, on p. 88, he has turned eleven funerary inscriptions of gladiators to dramatic account by collating into a table the information they afford. Various interesting items emerge as to usage of "noms de guerre," and the like, but outstanding is the pathetic implication that a *secutor* or *retiarus* could expect to survive six fights and to reach the age of twenty-one years, on the average. Chapter V adds such information about the *ludica amphitheatrica* at Salona as could be gleaned from locally discovered sculpture and lamp decorations. Finally, in chapter VI, Dyggve marshals his evidence and attempts a reconstruction of the edifice, embodying his results in a series of excellent line drawings (particularly the difficult perspective on p. 124). The reconstructed ground floor and arena seem unimpeachable, with the exception of the vaults over the outer corridor (p. 122). I saw no reason why these should be groin vaults since the "quantité de gros fragments de voûtes écroulées" (p. 60) apparently included no groins, and since the only two vaults surviving in a comparable position (p. 61 and fig. 26) are flattened transverse tunnel vaults. It seems gratuitous to assume that special centering was constructed for these two vaults only. While the level and plan of the second story are traceable on a natural declivity which is absorbed into the north half of the building, yet all the superstructure of this story, and the portico reconstructed above it, are very hypothetical. The surviving details (figs. 29 and 30) are unavoidably ambiguous, but Dyggve has succeeded in fitting most of them into the familiar pattern of an amphitheatre superstructure. He concludes this part with two extremely interesting architectural analyses, first, of the building's circulation, whereby the converging populace of a city (he estimates an audience of 15,400) could distribute itself with Roman precision (pp. 41, 112, 114, fig. 70), and, secondly, an analysis of the practical procedure by which a plan 124 m. long could be laid out on the basis of a geometrically perfect oval (p. 126 ff.). This sort of observation, which goes to the roots of Roman

architecture and manifests its underlying greatness, is only possible to a point of view like Dyggve's which perceives more in architecture than architectural ornament. In the concluding chapter he seeks to establish a chronology for the amphitheatre. He can adduce no absolute proofs, but, by making use of secondary evidence such as relation to the fortifications, expansion of the city, and stylistic character, he rather convincingly establishes that most of the building was erected about 170 A.D. Finally, he summarizes its subsequent history, during which the dwindling ruins accommodated two VIth century Christian oratories, whose frescoes partially survive, and, later, a Turkish garrison. In conclusion, I think this is a splendid study. With enviable virtuosity Dyggve has brought to bear on his amphitheatre the "apparatus criticus" of scholarship, the architectural grasp of a professional, and a keen historical imagination, which combine to make a few old stones seem again significant of ancient life.

Weilbach's 22 pages on the temple seem to me to arrive at no such happy conclusion. His arguments are careful and clear; his photographs are good; and he has the advantage of Dyggve's surveying and draughting. But the trouble is that the evidence is not all in. Most of that evidence must have resided in the arrangement of the dirt that was removed, in the relation of foundation fills to footings, and in the series of superposed strata. The day has gone by when an excavator can, with a good conscience, merely follow along the top of a wall (figs. 12-15) or sweep the best evidence off a site without record. Unlike the amphitheatre, this appears to have been primarily a stratigraphical problem; and that lack of technique which, in the case of the amphitheatre, was of secondary importance, seems here to vitiate the whole result. On pp. 25-31 are presented the conclusions and reconstructions of the complex. It is proposed that a typical Roman prostyle temple on a podium was erected (and later widened) with its face to the north, that the back wall of a subsequent theatre to the north was built flush up against the temple portico, completely blanking it, and that this anomalous architectural relation was not only left as such, but received the monumental emphasis of a framing portico on each side of the temple. As Weilbach says (p. 28) such a relation is "probablement unique dans l'art romain de bâtir." In fact such a conclusion would only be acceptable if it were inescapable. But I do not

think it is inescapable, even on the evidence offered. This same evidence seems to allow of a simpler and more probable series of constructions; first, the narrow temple facing north; second, the widening of the temple, and, I suggest, its re-orientation so as to face south, all this concurrently with the erection of the colonnades to east and west and the theatre on the north; thirdly, the relating of the temple group and the theatre by means of steps. This re-orientation on the old podium seems theoretically probable, since the cross-axis of the new south portico would align exactly with the central axis of the two colonnades, as framing motives (fig. on p. 25); but, above all, it makes a possible architectural ensemble wherein temple and theatre face away from each other, their rear walls being in contact. As a matter of proof, it would be necessary to show evidence that steps, with their flanking walls, had been applied to the south face of the old podium. Weilbach notes irregularities of construction at both corners of this face (pp. 14, 25) which certainly suggest the bonding in of such flanking walls. But the real proof would be a series of trenches just to the south, carried to full foundation depth. These should show whether there were steps, even if they had been subsequently removed. But, surprisingly enough, this whole area has been left as an unexcavated island. This is my reason for saying the evidence is not all in.

A volume by Dyggve on the above-mentioned theatre is promised as the next in this series. It will be a valuable contribution if it maintains the quality of his amphitheatre study.

GEORGE H. FORSYTH, JR.

PRINCETON UNIVERSITY

LES MONUMENTS DE LA CULTURE PROTOBULGARE ET LEURS RELATIONS HONGROISES, by Géza Fehér. *Archaeologia Hungarica*. Pp. 173, fig. 108. Budapest, 1931.

Since 1899-1900, when the Russian Archaeological Institute of Constantinople excavated Pliska, the ancient capital of the Bulgarians, and brought to light the remains of important constructions, many studies have been devoted to this early period of Bulgarian history. In the present work, written in Hungarian and in French, Mr. Fehér brings together the results obtained so far and he presents a general picture of the cultural state of the Protobulgarians, that is of the Bulgarian people before their conversion to Christianity.

The main points of the author's thesis are the following. Long before the Vth century, when they first invaded the Byzantine empire, the Bulgarians had ceased to be nomads; their chief occupations were agriculture and cattle raising on a large scale. When they came into the Balkans they possessed a material and intellectual culture which far surpassed that of the Slav populations which occupied this region. It was for this reason that they were able to conquer them and to establish a well organized government. Mr. Fehér reaches these conclusions by examining the evidence furnished by linguistic and archaeological sources. The former are rather scant since the Bulgarians gradually abandoned their native tongue and adopted that of the Slav populations, but some words of the Turkish dialect which they spoke have passed into the Magyar language and have thus survived to this day. These are mostly terms used in connection with agriculture and cattle raising, which tends to prove that the Bulgarians were familiar with these occupations even before they came to the Caucasus on their way to the West.

Mr. Fehér defines the limits of the territories occupied by the Bulgarians in the three periods of their advance; he then studies the remains of constructions found in these regions and he shows their oriental character. The Bulgarians built not only fortresses but also long lines of ramparts. The latter are characterized by the "berme," which is a platform running between the ditch and the embankment, a typical construction of all the ramparts built by Turkish tribes. Hence the Bulgarians had brought with them the knowledge of this type of fortification and this shows that already in their native home they were accustomed to surround their territories with ramparts, behind which the people could be sheltered and could devote themselves to their peaceful occupations.

The oriental character of the buildings, remains of which have been found in the important cities of Pliska, Madara and Preslav, is also emphasized by the author. He follows Prof. Filov in recognising the Sassanian origin of the large palace of Pliska. He shows that contrary to the tradition of the Byzantine people, the former occupants of the country, the Bulgarian palaces were built in stone and not with bricks. These blocks of stone were not taken from ruined Roman buildings but they were, for the most part, cut into rectangular blocks by Bulgarian workmen who left

their mark in the runic signs they carved on some of them. Here again we have the proof that the Bulgarians were already familiar with the art of building large stone constructions before they settled in the Balkans.

The sculptured works also differ from Byzantine examples and show a strong oriental influence. In several localities, the most important of which is Edze, statues have been brought to light of the type known as the "Kamennye baby," found in all Turkish settlements. These are statues of a man or of a woman holding a bowl with both hands; they were erected to honor the dead. The author makes a very interesting comparison between these and the famous rock relief of Madara representing a horseman treading on a dead lion and followed by a dog. The horseman also holds a bowl and Mr. Fehér identifies this relief with the funerary statue of the khan Krum. The early Bulgarian character of this work is revealed furthermore by its connection with Sassanian art, for only in this art do we find parallel examples, and by the fact that Madara was one of the most important centers of Protobulgarian culture.

Sassanian influence may be seen also in other sculptures, for instance in the synthetic and antithetic groups of animals carved on several stone panels and on a capital. All these reliefs, concludes the author, are the work of Bulgarian artists for they show a combination of Turkish and Sassanian motifs executed in a style which, in its tendency toward a more naturalistic representation, shows the influence of Hellenistic art. This influence had been active when the Bulgarians were in their oriental home and it increased when they settled in the Balkans.

The skill of Bulgarian craftsmen may be observed also in the goldsmith's work. The most important examples are those found at Nagyszentmiklos. Mr. Fehér dates them and proves their Bulgarian origin by studying the inscription on one of the vases. The peculiar form of the letter *B*, with the horizontal bar drawn under it, is found in inscriptions of Bulgarian rulers, dating between 820 and 906. At this time the territory in which the treasure was found was occupied by the Bulgarians. Moreover two words may be identified with Bulgarian words: *BOYHAA*, which is the name given to the upper caste of the Protobulgarians, and *ЗОПАН* which some scholars have compared with *ЗСПАН*, the name of a dignitary as shown by the inscription of the khan Omurtag.

After a fairly rapid survey of the fragments of

ceramics discovered so far Mr. Fehér passes to the study of the Greek inscriptions. We should be especially grateful to him for reading and translating the important and difficult inscription of Madara.

The book gives us in a clear and interesting manner the present state of the knowledge concerning the cultural history of the Bulgarians before their conversion to Christianity. The author has treated the subject with all the authority acquired by many years of investigations in this field, and with the love that a long acquaintance always gives. But one may wonder whether he has not been led sometimes to overemphasize the purely oriental character of this culture. It is hard to imagine that the Bulgarians could be the neighbors of such an important cultural center as the Byzantine empire and yet remain impervious to its influence. Part of the Greek population had certainly remained in the region occupied by the Bulgarians, even after the retreat of the Byzantine armies, and one may wonder whether some of these did not assist in the execution of the reliefs around which are carved inscriptions in the Greek language. Another influence which should have been taken into consideration is that of the Armenians. We know from the writings of Armenian historians that they were acquainted with the Bulgarians when the latter were temporarily settled in the Caucasus. At that time the Armenians had a very flourishing civilization, and if it is true that the Bulgarians were able to build in stone, when they came into the Balkans, it is much more plausible to assume that the Bulgarians had learnt this art from their Armenian neighbors, who constructed in this manner, rather than from the Persians who used bricks. The Bulgarians came into contact with the Armenians also at a later date, in the middle of the eighth century, when the Byzantine emperor Constantine V Copronymus transferred to Thracia important colonies of Armenians and Syrians. It is interesting to note that most of the important buildings of the Bulgarians are posterior to this date. However, if on points of detail one may disagree slightly with the author it is impossible to deny the interesting character of the Bulgarian art of this early period. Mr. Fehér has rendered a great service in making accessible to western readers the important results of his own investigations as well as those of his Bulgarian and Hungarian colleagues.

SIARPIE DER NERSESSIAN

WELLESLEY COLLEGE

À TRAVERS LES VILLES MORTES DE HAUTE SYRIE, *Mélanges de l'Université Saint-Joseph, Beyrouth, Tome xvii, Fasc. I*, by P. Joseph Mattern, S. J. Pp. 176, pls. 58, figs. in text 36. Beirut, Imprimerie Catholique, 1933. 60 frs.

P. Mattern's book is the result of a series of archaeological trips made in North Syria during 1928, 1929, and 1931, primarily for the study of Christian architecture. As the author himself states, he has made great use of the well-known publications of the Marquis de Vogüé and of Howard Crosby Butler, though limiting his study to a smaller area of Syria. In this book the region considered involves only that quasi-desert portion of northern Syria which is situated between the four great ancient cities of Antioch¹ at the west, Apamea to the south, Chalcis to the east, and Beroea to the northeast. Thus the basalt churches of the Haurān and the Ġebel-Druse are omitted. The purpose of the book, according to the author, is not that of a guide for tourists because of the difficulty of travelling in much of the region, but rather is it merely intended to give some idea of Christian architecture in north Syria to readers unable to procure the works of de Vogüé and Butler.

Thus the volume does not pretend to offer much that is new. A few sites previously unstudied are discussed, notably El-Breig, Me'ez, and Sarfoūd in the Ġebel Barīša. The column of the stylite of KFR DRN (Kfar Deriān), mentioned in a Syriac manuscript in the British Museum, was located, and two previously uncited churches at El-Bāra were discovered by means of airplane photographs. One of these churches — that which the author calls El-Hosn — is unique among Early Christian churches in the region in employing lintels rather than arches over the columns of the nave, and in addition may have had a tribune above, a feature very rare in north Syria, though Butler suggested the possibility of the existence of a tribune in another church, No. 3, at the same site. P. Mattern also would identify as the cells of hermits certain edifices whose purpose has previously been unexplained: namely, the square structure on eight columns in the enclosure of the south church at Rouweiha and the tower to the north of the church at Quasr el-Banāt.

¹ With the exception of these four cities, the spelling of Syrian names in this review follows that of P. Mattern rather than the more usual English transliterations of H. C. Butler.

He sadly notes the continued demolition of many of the ancient Syrian remains by natives seeking for building materials. Some very important edifices are all too rapidly disappearing. At Hāss the great church mentioned by de Vogüé and of which a considerable part still existed at the time of the first Princeton Expedition under Butler in 1900, is no longer to be seen, and P. Mattern says that he himself witnessed the demolition of one of the pyramidal tombs at El-Bāra and of the funerary chapel of Quasr el-Banāt.

In his effort to uphold the glory and importance of the Syrian churches, P. Mattern sometimes states as fact archaeological theories for which complete evidence is lacking and concerning which there is still much dispute. For example, he assumes without question that the two-towered church façade of medieval architecture in Europe was directly derived from the Syrian type as found at Qalb Lōzé and at the now destroyed basilica of Tourmānīn. He also makes the unqualified assumption that all central-type churches attest a direct oriental influence from Persia or Mesopotamia, disposing of this very complex problem with a single sentence in a footnote. Likewise highly debatable is his statement that the influence of the Greek temple is to be seen in the fact that the old houses of Normandy, Flanders and Alsace have their gables facing the street, a statement made without citing the slightest evidence or authority. Finally, in his conclusion he somewhat irrelevantly compares the modern material of ferro-concrete with the stone of the Early Christian architecture of Syria, to

the complete aesthetic disadvantage of the former, despite the fact that all the rest of his book essays to be archaeological rather than critical in content.

Though the text contains little that is new, the volume is illustrated with many original photographs, most of which are unfortunately reproduced at a size that is too small. Of particular interest are the airplane photographs of several important sites. These aerial photographs, which were taken by the French army for St. Joseph University, not only give a striking idea of the former richness and extent of the provincial Syrian cities but also offer archaeological information of considerable importance. For example, the irregularity in the axes of the plan of the church of St. Simeon Stylites at Qal'at Sem'ān, missed by de Vogüé but detected by Butler, appears very clearly in the view from the air.

All in all, the volume should prove to be most useful for the purpose for which the author states it is *not* intended, as a handbook for the more serious tourist. In spite of the author's occasional use of a travelogue style of writing, i.e., "Early on the twenty-second of July our automobile took us in a south-easterly direction . . .", the book is for the most part clearly and interestingly written. It is well indexed and in addition has at the back a useful list of dated monuments. Thus while it is at best a secondary book, it nevertheless serves the purpose of a somewhat summary introduction to the subject of Early Christian architecture in North Syria.

D. D. EGBERT

PRINCETON UNIVERSITY

AMERICAN COUNCIL OF LEARNED SOCIETIES

Preliminary notice is given by the American Council of Learned Societies of opportunities to be offered during the summer of 1935 to mature scholars for expanding their interests and competence in Chinese and Japanese studies, Arabic and Islamic studies and the Russian language. A series of seminars will be held designed specifically for mature teachers in universities and colleges.

The *Section on Chinese and Japanese Studies* will be held at Columbia University from July 5 to August 16, 1935. D. C. Goodrich, Director of the section, will teach the Chinese language. Arthur W. Hummel, of the Library of Congress, will teach Chinese history; Benjamin March, of the University of Michigan, Chinese art; Carl W. Bishop, of the Freer Gallery, the pre-history of Asia; Ryusaku Tsumoda, of the Society for Japanese Studies, the Japanese language; Shunzo Sakamaki, of Columbia University, the history of Japan; and H. G. Henderson, of Columbia University, Japanese art.

The second *Russian Language Institute* will be held at Columbia University from June 25 to August 31. Instruction will be in charge of George Z. Patrick of the University of California, assisted by lecturers. An elementary course will be planned to give a useful control of Russian materials to historians, political scientists, and other scholars to whom these materials are necessary. The advanced course will be intended for those already having some command of the Russian language.

A *Seminar on Arabic and Islamic Studies* is being planned at Princeton University, to run approximately from June 20 to July 31. It will be offered, if funds can be secured, under the direction of Professor Philip K. Hitti, of Princeton University, and will be designed for medievalists, historians of science, the fine arts, and Eastern Europe, linguists, scholars of Romance languages, and others who find some competence in it desirable. Special work in the Arabic and Turkish languages will be available. Its sponsors would like to hear from anyone interested.

Further information can be had from Mortimer Graves, American Council of Learned Societies, 907 Fifteenth Street, N. W., Washington, D. C.



PLATE XXVIII.—THREE CONTIGUOUS MOSAICS FROM OLYNTHOS

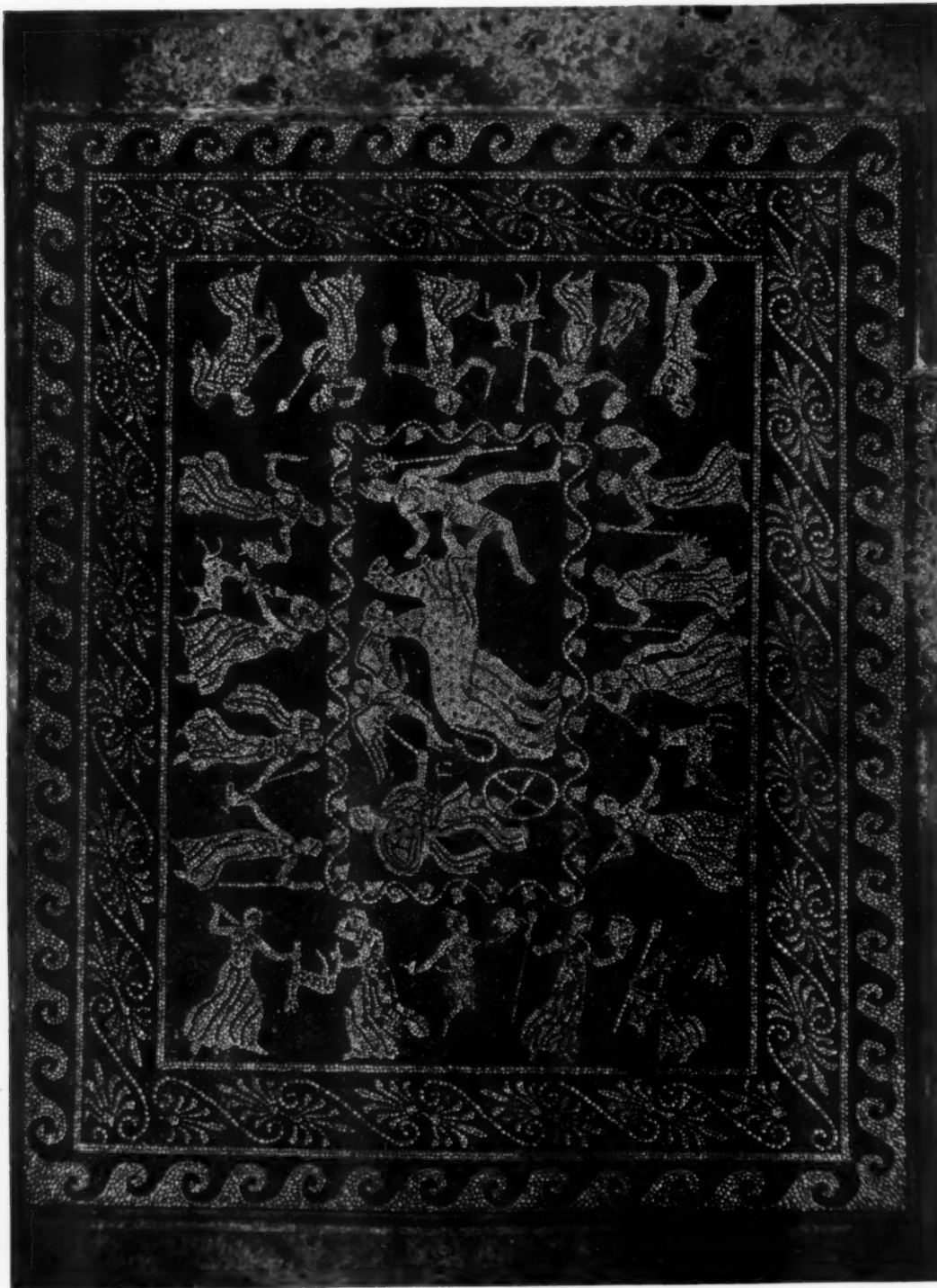


PLATE XXIX.—MOSAIC IN THE ANDRON OF THE VILLA REPRESENTING DIONYSOS IN HIS CHARIOT SURROUNDED BY DANCING MAENADS, A SATYR AND PAN



PLATE XXX.—PEBBLE MOSAIC WITH A REPRESENTATION OF ACHILLES, THETIS AND NEREIDS

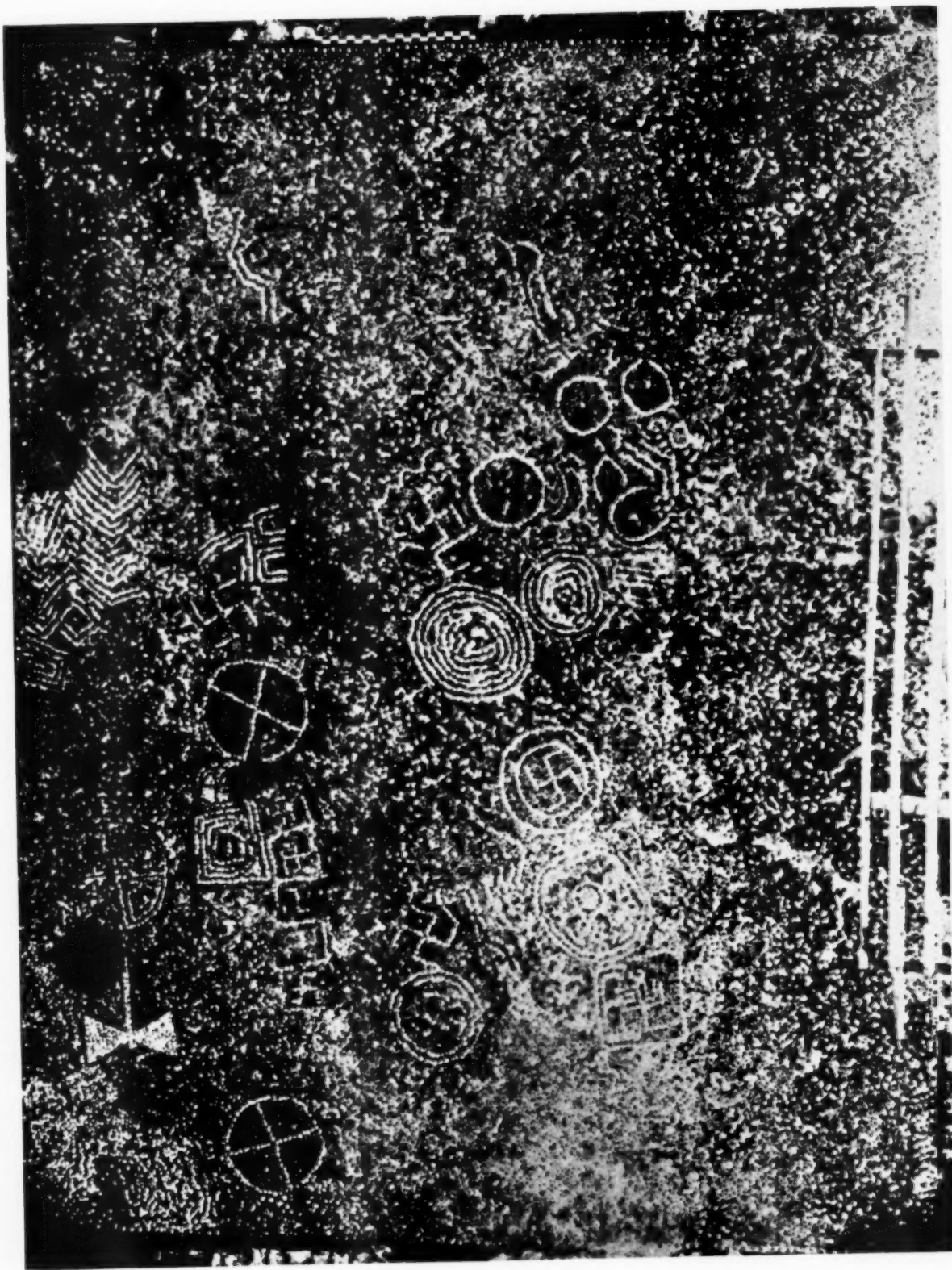
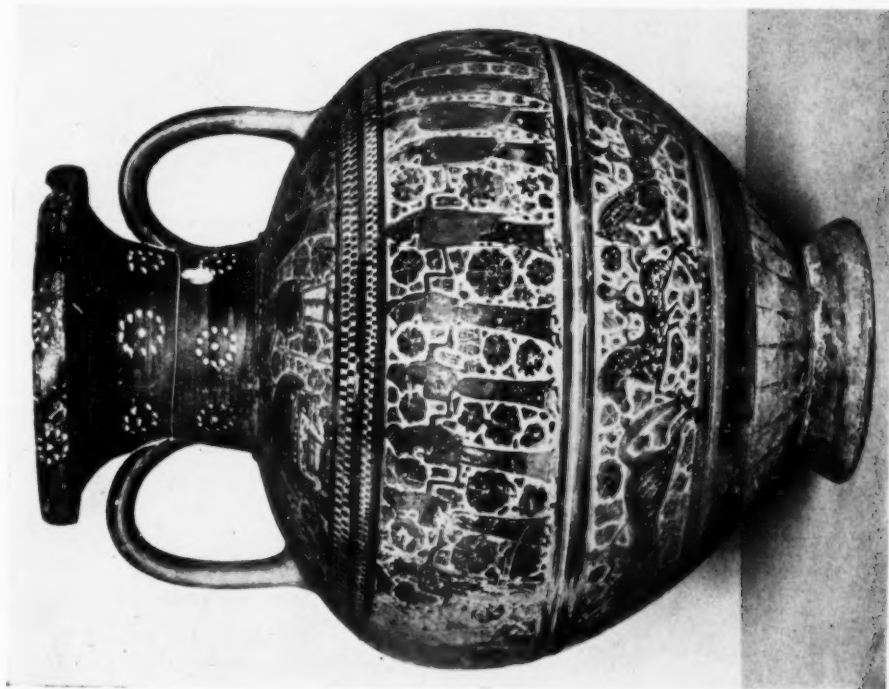
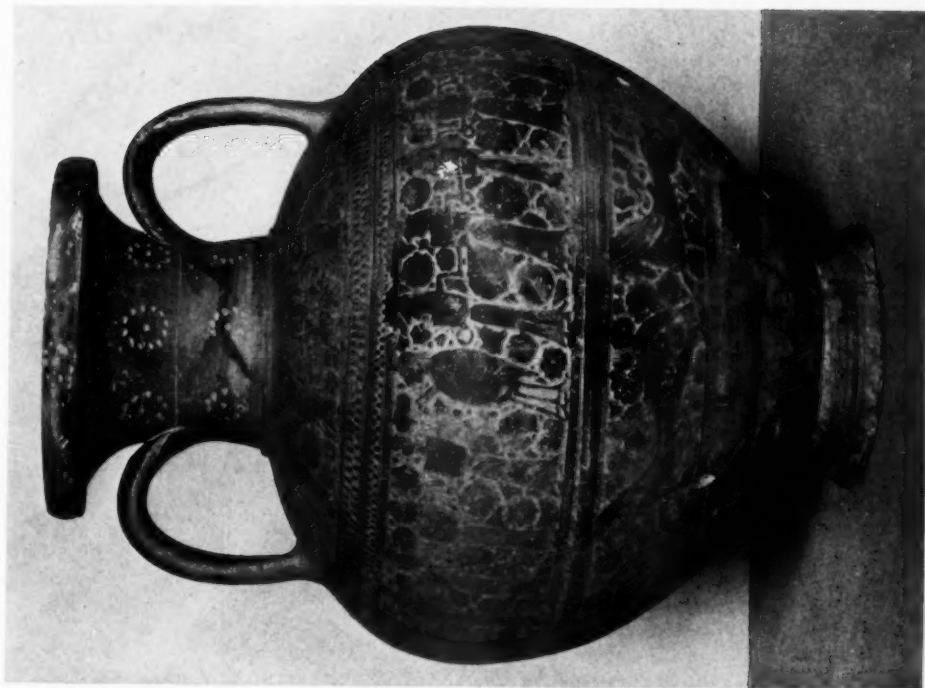


PLATE XXXI.—MOSAIC WITH MANY SYMBOLS, INCLUDING SWASTIKA AND DOUBLE AXE

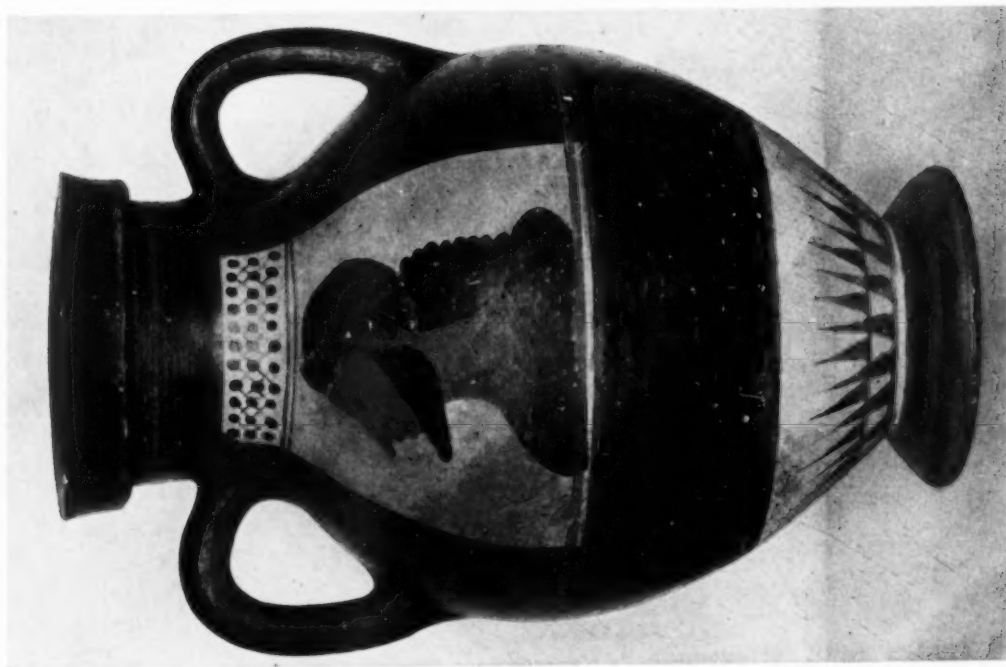


A

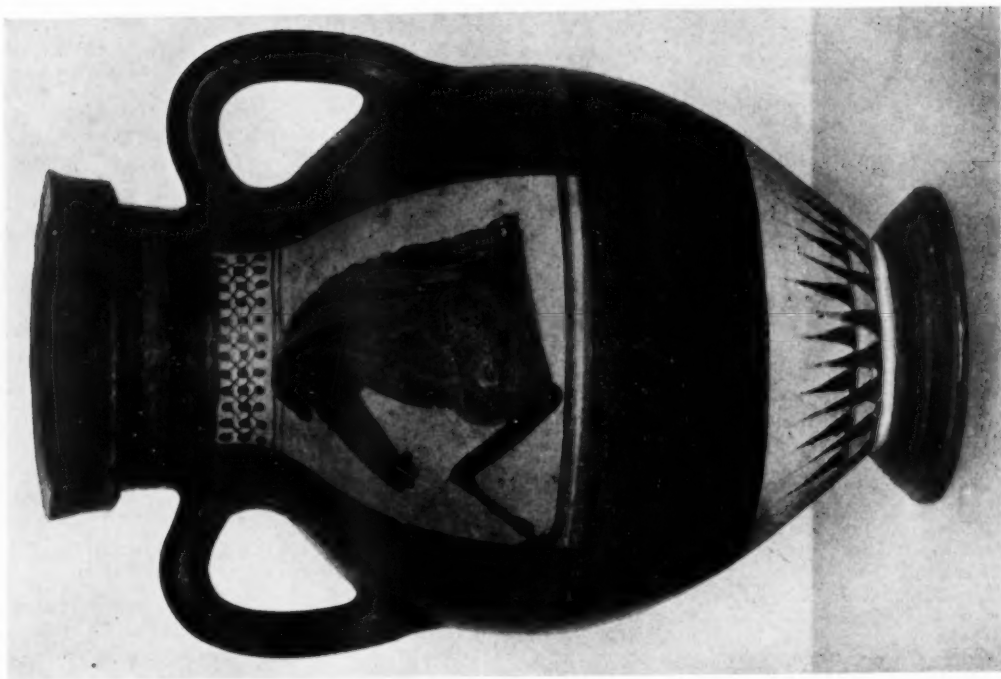


B

PLATE XXXII.—EARLY CORINTHIAN AMPHORA. HEIGHT, .412 M.

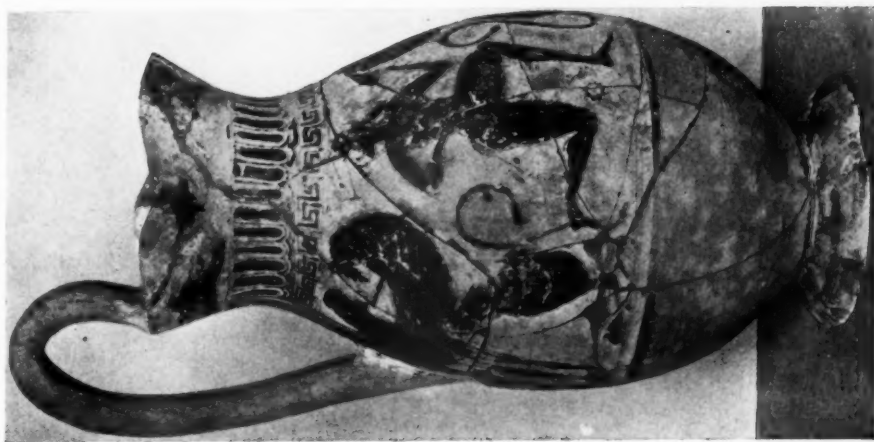


A



B

PLATE XXXIII.—MIDDLE CORINTHIAN AMPHORA. HEIGHT, 323 M.



A



B



C

PLATE XXXIV

A & B—Late Corinthian Olpe. Ht. .305 m.
C—Attic Mastos. Ht. .103 m.; diam. .136 m.



A



B

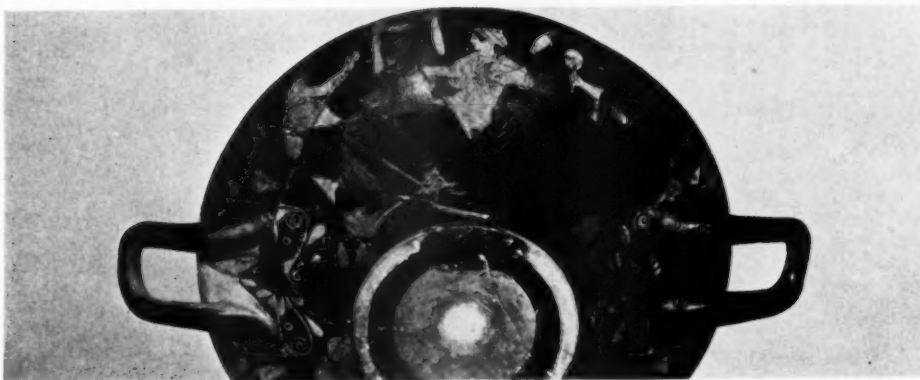


C

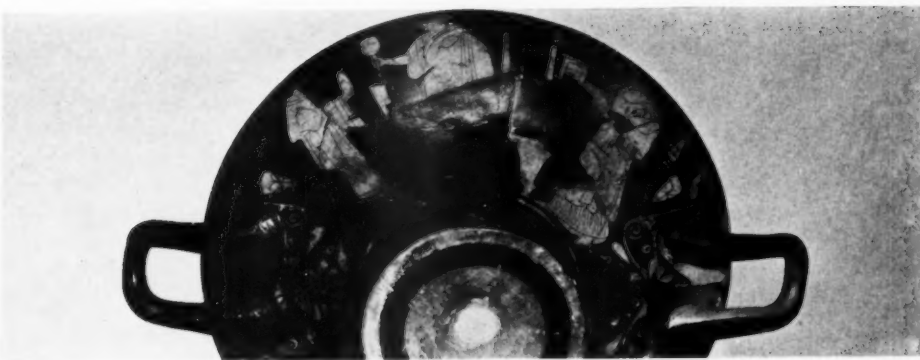
PLATE XXXV.—CUP BY THE PAINTER OF BERLIN 2268. DIAMETER, .27 M.



A

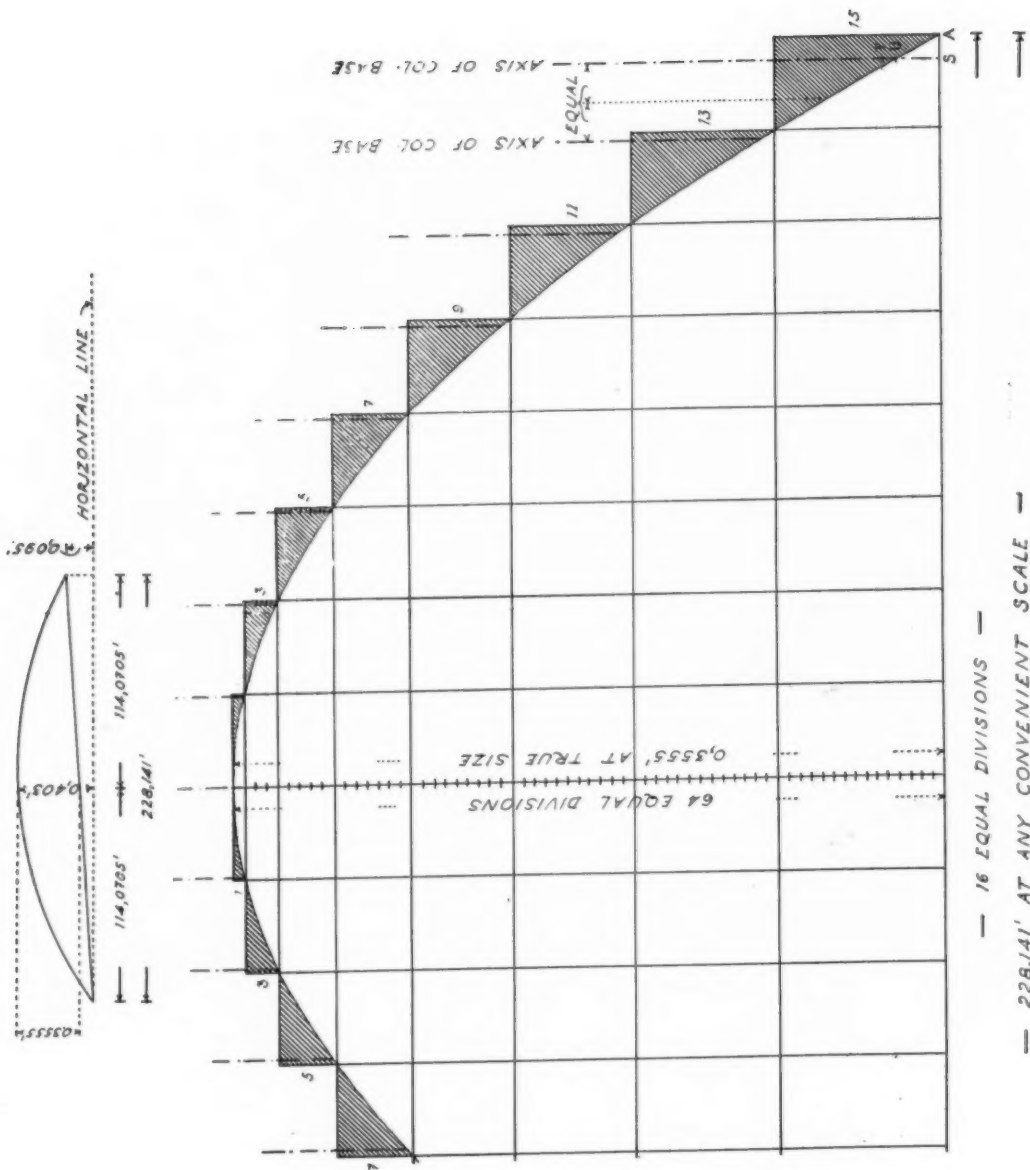


B



C

PLATE XXXVI.—CYLIX BY THE SABOUROFF PAINTER. DIAMETER, .225 M.



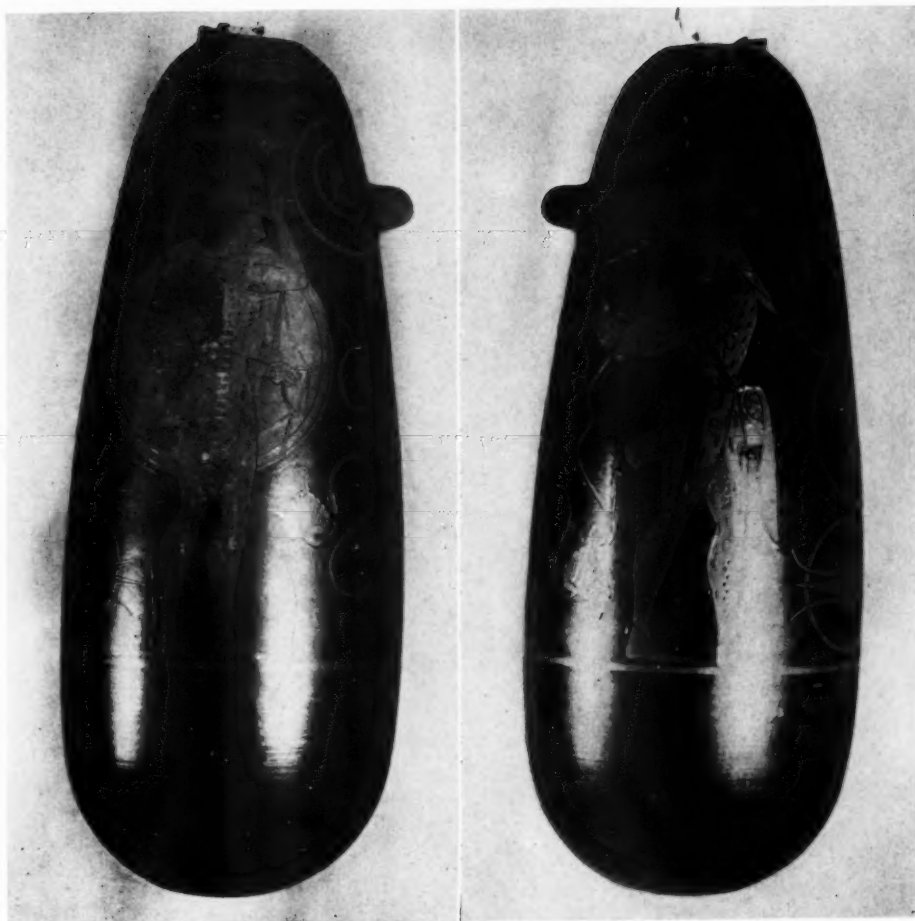


PLATE XXXVIII.—ALABASTRON SIGNED BY PSIAX, IN ODESSA



PLATE XXXIX.—ANCIENT CENTERS OF THE IRON INDUS & MAIN TRADE R.

PLATE XXXIX.—ANCIENT CENTERS OF THE IRON INDUSTRY AND MAIN TRADE II